

AUTOMOTIVE INDUSTRIES

THE AUTOMOBILE

Reg. U. S. Pat. Off.
Established 1902

Volume 59

No. 13

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P. M. HELDT, Engineering Editor
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Automotive Industries is published every Saturday by
CHILTON CLASS JOURNAL COMPANY
Chestnut and 56th Streets, Philadelphia, Pa.

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JULIAN CHASE, Business Manager
Automotive Industries
Cable Address.....
Telephone.....

GEO. D. ROBERTS
Advertising Manager
Autoland, Philadelphia
Sherwood 1424

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Owned by United Publishers Corporation, 239 West 39th Street, New York; ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK, President; C. A. MUSSELMAN, Vice-President; F. C. Stevens, Treasurer.

SUBSCRIPTION RATES: United States, Mexico and U. S. Possessions, \$3.00 per year; Canada, \$5.00 per year; all other countries in Postal Union, \$6.00 per year. Single Copies, 35 cents.

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Automotive Industries — The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

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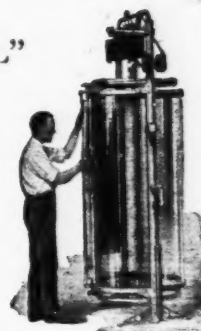
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Distributor Still is *Indispensable* in Car Marketing Plans

Seventy per cent of automobile manufacturers continue
to regard him as backbone of selling organization.
Will handle 40 per cent of 1928 production.

By Norman G. Shidle

SEVENTY per cent of the automobile manufacturing companies in business today are relying on a distributor organization as the basis of their merchandising and distribution scheme.

Despite the fact that about eight manufacturers, as they have got into the quantity production class or as they are dealing only in very high-price specialized lines, have found a direct dealer or a branch-to-dealer policy to be more efficient and economical than working through distributors, the distributor continues to be the backbone of the marketing organization of the vast majority of car builders and bids fair to continue a factor of real importance for a long while in the future.

Among the companies which, today, are operating without the use of distributors are to be found such makers as Dodge, Oakland, Chevrolet, Ford and De Soto in the low-priced group. Only a few builders of high-priced cars, notably Rolls-Royce, Lincoln and Cunningham, are selling without distributors. One or two other manufacturers in the quantity production field are looking toward the gradual elimination of distributors.

The fact remains, nevertheless, that today—five or 10 years after some commentators began singing funeral dirges for the automobile distributor as such—40 per cent of the total output of the industry is being manufactured by companies relying mainly on distributors and partly on branches as their chief marketing agencies. It is worth noting, also, that

SEVENTY per cent of the car companies in business today are relying on distributors as a basis of their marketing organization.

* * *

IN 1928 forty per cent of the total car production for domestic consumption is passing through distributors and branches.

* * *

ON Jan. 1, 1928, there were 2889 passenger car distributors in business.

some of the companies which have eliminated distributors entirely so far as terminology goes, have in effect merely changed the type and size of distributor being employed and changed his name to that of dealer. A dealer, having a direct factory contact, who in turn has under him a number of sub-dealers, is in effect nothing more or less than a small distributor. Thus, while the 30 per cent of companies which have eliminated distributors no

longer operate through wholesalers having large territories, they are, in many instances, operating through much smaller wholesalers who do a retail business as well. The difference in size as compared to the old distributor is great, but the difference in basic function is relatively small.

There is no question, however, about the disappearance of the old type of distributor from the merchandising plans of quantity producers, particularly those in the lower price ranges. But there are equally strong indications of his continuance by some of the most successful and largest builders in the middle and high-priced fields as well as by practically every one of the smaller factories. Because the distributor form of organization embodies certain factors inherently not well adapted to the sale of lower-priced vehicles in quantities sufficient to take care of great factory production facilities, there has developed a tendency in some quarters to overemphasize to the point of inaccuracy the admitted weaknesses of some types of distributor and to neglect entirely the cur-

rent as well as the past potentialities for constructive marketing inherent in the utilization of good distributors in particular and of the distributor type of organization in general.

Some recent commentators on the place of the distributor in the automotive selling scheme, for instance, have indicated that the passing of the distributor in most instances has been due partly to a belief of factory executives that their distributors were, for the most part, lazy and inefficient operators who merely collected five to eight per cent for okeying orders from dealers and to a belief on the part of these same executives that the aforesaid five to eight per cent might be saved to the factory by operating on a direct dealer contact plan. One of these commentators, D. G. Baird, writing an article called "Why is an Automobile Distributor?" in the Aug. 25 issue of *Sales Management and Advertisers Weekly*, quotes an anonymous factory executive as saying "Our distributors do practically nothing to earn their discounts. They just sit back and take their rake-off for okeying dealers' orders."

Others View it Differently

This sentence, as a matter of fact, presents pretty much the gist as well as the point of view of Mr. Baird's discussion of this question. The phraseology of the statement quoted, referring as it does to the distributor's "rake-off," would seem to put the business of wholesaling automobiles in the class of what is usually called a racket in these modern days, and at the same time take it out of the realm of being a legitimate business and distributing function.

While some factory men must feel this way about it, inasmuch as they are quoted quite specifically by Mr. Baird, it is equally certain that other important factory executives feel just as strongly that the distributor is the means by which their business has been built, the powerplant by means of which it is now running and a most important factor in creating the impetus which will enable them to continue successfully in the future. This is not to say that there is any factory man to be found who has no criticism whatever to make of distributors, just as we have yet to find a distributor who has no criticism to make of the factory for which he is operating. It does mean, however, that a large majority of automotive executives today still feel that the distributor will remain a distinct and vital part of their merchandising scheme for a good many years to come.

Profits Generally Deserved

"Why, we would be in a fine mess if it weren't for our distributors," the president of one highly successful factory organization said only the other day. "It's silly to sit around and talk about them raking off five to eight per cent without doing any work for it. We have several distributors who have more than \$1,000,000 invested in our franchise. One distributor has over \$2,000,000 invested in it. Those men have a greater stake in our success than a lot of the salaried executives at the factory. Of course, we have had cases of distributors who made their pile and then wanted to spend all their time in Florida and California to the detriment of their business and our welfare in their territory. Sometimes we have had to talk very seriously with men on that score. But that has not been true of a majority of distributors and it wouldn't be at all fair to judge the distributor system as a whole on the basis of

its results in these few exceptional cases.

"No, we aren't always satisfied with what our distributors do nor with the results which they achieve; but we wouldn't be satisfied with the results achieved through a direct dealer organization, either. With the individual investment which the distributor has in his business, we feel that we have a big asset to help us in working out with that man and with the individual dealers the best means of getting the most out of his territory.

"Sometimes a distributor does fail to make his quota in certain parts of his territory. We will ride him for it, of course; sometimes we will ride him even when we know down in our hearts that he got more than we could have got trying to work direct. No, the distributor on the average has worked out very well for us; we try our best to make our interests his interests; to talk freely and frankly with him about all of our mutual problems and to function with him on a friendly basis at all times. The door to my office is always open to a distributor."

That was one side of the picture. Then a day or so later, there came the following reaction from an executive vice-president of an even more successful passenger car manufacturing company which operates with a few branches and a great many distributors:

"What some folks fail to take into account," he said, "is the basic economic aspects of the distributor situation. Look at the companies which have gone to direct dealer contacts. Only in a few cases have they made the move with any special animosity toward the distributor. They have changed simply because their product and their factory necessities had developed in such a way as to make the factory necessities no longer coincide with the interests of the distributor from a few basic economic standpoints.

When Every Sale Counts

"Take the factory which gets geared up for large production of a relatively low-priced automobile. Suppose it has been operating with distributors in the past. What happens when competition becomes keen and the entire possible output of the factory can be disposed of only by selling every car that possibly can be sold any place in the country?

"Under those conditions, it becomes logical and necessary that the factory demand dealer representation and sales in the farthest confines of each territory. To obtain and hold representation in some of these areas may cost the distributor so much as to render profitless any cars which he might get rid of through that source. Naturally, he isn't going to work very vigorously to get that representation and sell those relatively profitless automobiles.

"The sale of those particular cars is profitable to the factory, however, because they help to keep up the quantity and keep down the overhead. Thus, quite apparently, there arises a distinct difference in interest as between the factory and the distributor. As that difference in interest continues and grows in significance, it is natural and logical that the factory should go to a direct dealer system.

"That situation has arisen for a number of companies in the industry and undoubtedly will arise for several more inside of the next five years. To recognize this, however, as a cold economic fact, is something quite different than to sing funeral dirges for the automobile distributor as such. Our factory still has nearly 100 distributors and we are going to have

a number of distributors as far in the future as I can see."

Still another executive, pointing out the same economic basis for the change from distributors to direct dealer contacts, adds that the real saving is in the ability of the factory to get its needed volume and thus keep down its operating overhead rather than in the elimination of the distributor and his commission as such. "The function of the distributor has to be performed," he urges, "whether by the factory itself or by a distributor as such."

This reaction is borne out by the following statement made by *Automotive Industries* a few weeks ago. "It is strange at this stage of the game to see still stalking about the ancient myth that by eliminating a distributor or a branch the discount previously allowed is saved to the manufacturer."

"The distributor or branch performs a very definite marketing and distributing function. For some types of cars a field force under factory supervision dealing direct with dealers may perform that function more efficiently; but the cost of performing the function, while perhaps lessened, certainly is not eliminated."

"We have to remember," another sales manager remarked, "that in the long run the efficiency with which a given system is operated usually is more important even than the selection of the system itself. I know plenty of people won't agree with that idea, but I have seen it borne out in too many practical cases not to think pretty well of it personally."

Eliminating those cases where the basic economics of the situation point definitely to the direct dealer contact method as the one obviously best suited to the sale of the particular product, it would argue very strongly for factory omniscience to urge that the factory could always lay out a better method of operation by itself than could any distributor in any territory. Granting the desirability—even the necessity—for uniformity in methods throughout the country,

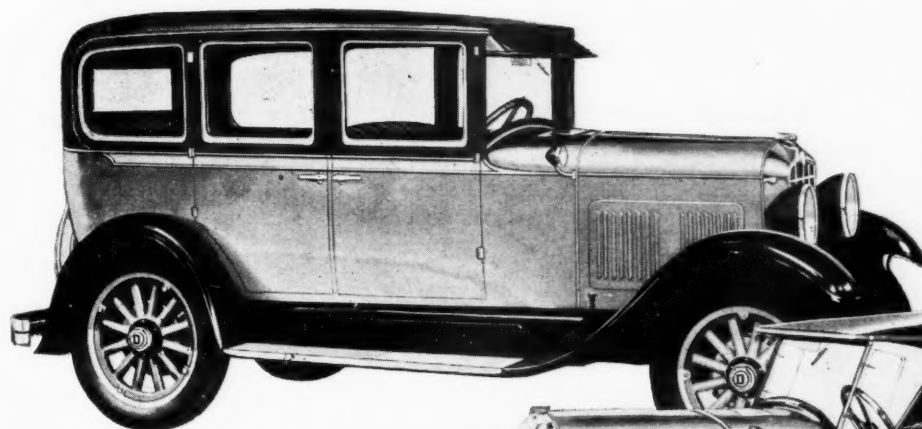
it is perfectly possible to conceive that the best methods might be determined more surely through consultation and cooperation with a group of individuals operating on the sales firing line as distributors do, but still having a considerable investment in the factory franchise, than through pure logic at factory headquarters.

Practically every factory recognizes this idea in principle and in practice when they select—as they usually do—for executive sales positions at the factory, men who at one time or another have functioned either as distributors or dealers. The need of that actual experience and knowledge in factory councils is recognized. Friendly and continuous contact with current experiences in the field through a distributing organization doubtless helps considerably in keeping factory policies in line with practical field needs.

Those companies which operate direct with dealers recognize this same need and meet it by the employment of many field men and district representatives who through constant and daily contact with dealers supply to the factory the necessary information and intimacy of touch with retail conditions and needs. Both methods work out successfully, but for the factory which cannot afford, by reason of its volume and the particular price class of its product, to employ so widespread and large a force of field men, the distributor offers the only possibility of keeping in touch.

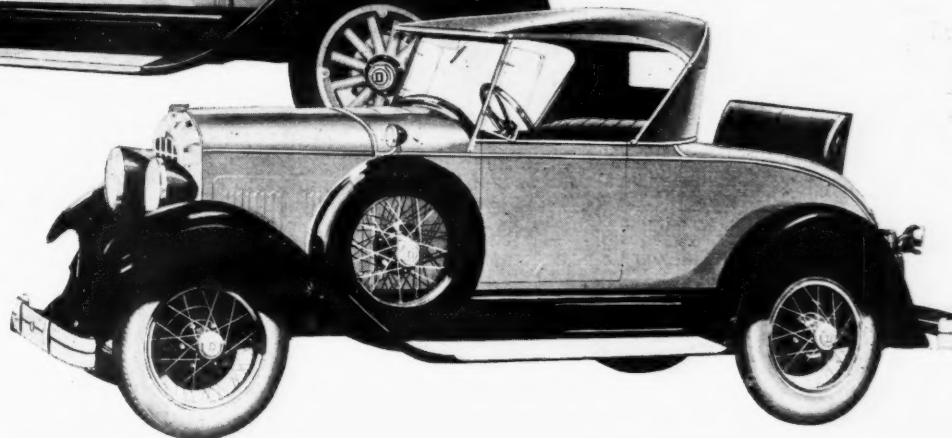
It would be fatuous to argue in favor of a distributor system for all types of automobile distribution at this date. Obviously the distributor is out on thoroughly sound economic grounds in a number of instances and will be going out on these same grounds in some other instances as time goes on. Nevertheless, it is only fair to recognize that the distributor still plays a vital part in the distributing system of a majority of automobile factories and that probably a third of the total unit production and 60 per cent of the dollar volume production of the industry still will have passed through his hands in 1928.

New Durant Four and Six-Cylinder Models



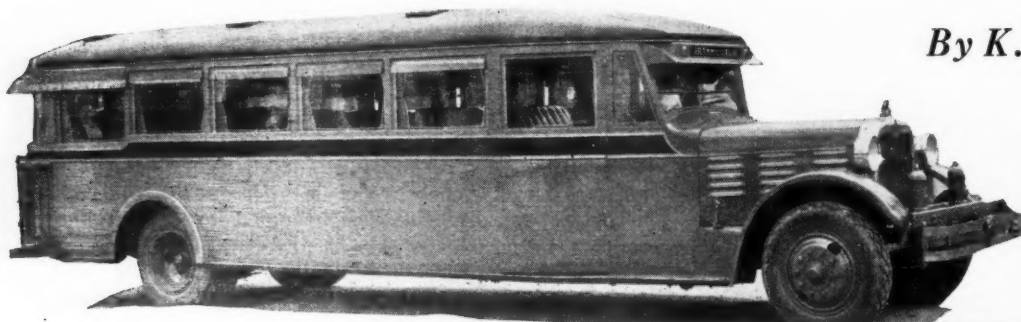
Changes which have just been incorporated in these two Durant lines were described in last week's issue. Left—Four-door, six-cylinder "60" sedan with 2 in. longer wheelbase, roomier body and Lan- chester vibration damper. It sells for \$845

Right — Four-cylinder de luxe roadster. As on the "60," all exterior bright parts are chromium plated. Engine is rubber mounted. Price of this model is \$675



Increased Comfort and Beauty

By K. W. Stillman

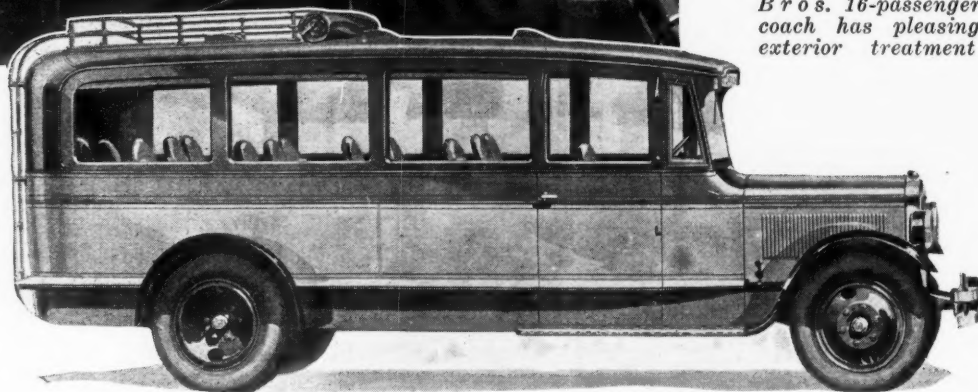


Left—The new
Gramm Model R-31,
236-in. wheelbase,
25-passenger parlor
car coach was ex-
hibited at the A.E.
R.A. show

Right—Interior of
Graham Bros. 12-
passenger coach,
showing placement
of individual, leather
upholstered seats



Below — Graham
Bros. 16-passenger
coach has pleasing
exterior treatment



AT the 1928 Show of the American Electric Railway Association, which has been in progress in Cleveland this week, there are 190 manufacturing exhibitors, of which 80, or about 45 per cent, are makers of automotive products. Since this number includes only about 20 bus and bus body builders it is evident that the displays of automotive parts, equipment and accessories have become a very important feature of this annual event.

As usual, a number of new bus models were first offered to the public at this show and among the particularly striking exhibits were those of the Twin Coach Co., and the Whitcomb Wheel Co.—the former with its definite invasion of the street car field with a strictly automotive product and the latter with the development of an unusual design of six-wheel bus chassis.

Continuing the trends of previous years in bus design, the effort is still directed toward greater riding comfort and a more pleasing appearance for buses. In the displays of every bus manufacturer, as well as in the exhibits of bus body makers, these two points, which apparently are necessary to secure patronage from the riding public and so are strong factors in the sale of buses, have been emphasized strongly.

Detail refinements are innumerable, but a general survey of all the exhibits brings to light certain strongly developed trends, either started this year or still further developed from previous accomplishments.

Entrance and egress is being facilitated by greatly increased headroom. At one time sufficient headroom to permit a person of average height to walk through the bus in an erect position was considered necessary only for urban type buses where standees might be expected. Now, apparently, it is believed that the interurban passenger will also appreciate more comfortable movement within the bus and at the show there are many parlor car type buses with a full six feet headroom over the aisle.

This has been accomplished in several different ways, none of which increases the apparent height of the bus to an appreciable extent. A rather common method has been to divide the baggage compartment,

Found in Latest Bus Offerings

Several particularly striking designs shown for first time at electric railway exhibit in Cleveland. Automotive products featured in 40 per cent of displays.

if it is placed on the roof, into two parts and elevate the ceiling of the bus down the center and over the aisle.

No more comfortable seats could be asked for than are found as standard equipment on nearly all buses, whether urban or interurban type. Leather or fabric leather upholstery is almost always used, which, in connection with air cushion seats, provides a most comfortable resting place.

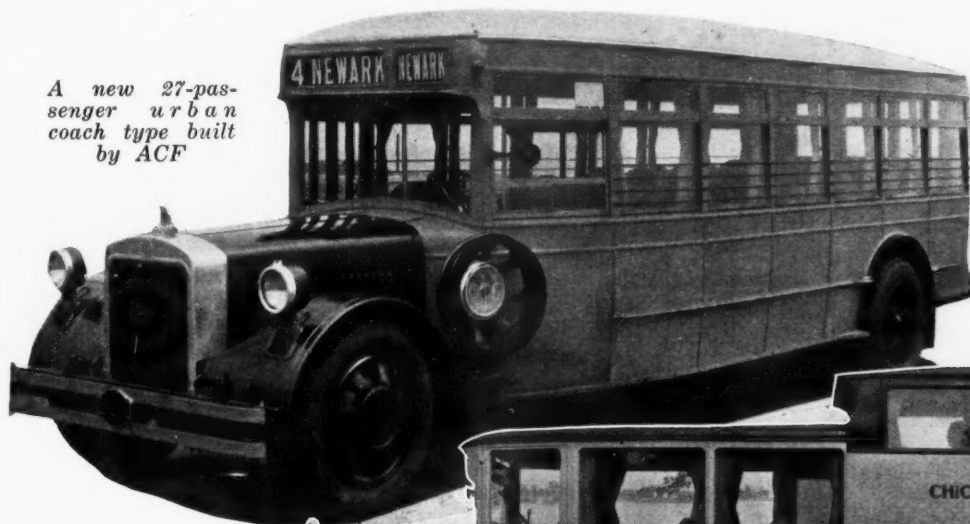
A very large proportion of buses are fitted with in-

dividual type seats and in almost as many each seat back is adjustable to a semi-reclining position. In most of the parlor car models the seat backs are provided with head rolls or cushions to add still more to the comfort of the passengers, and plenty of leg room is supplied without loss of seating capacity by the design of the seats commonly used.

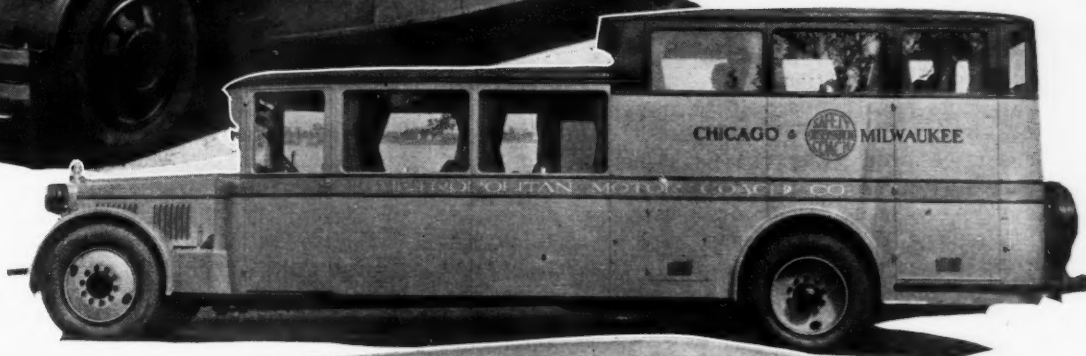
Every possible convenience is provided for each passenger, including mirrors on all window pillars, a signal cord within easy reach of his hand, ash trays in many instances and individual lights at each seat in lieu of or in addition to the usual dome lights.

Two problems in bus design which have bothered engineers for years and which still have not been completely solved, although becoming much less important with each year's progress, are those

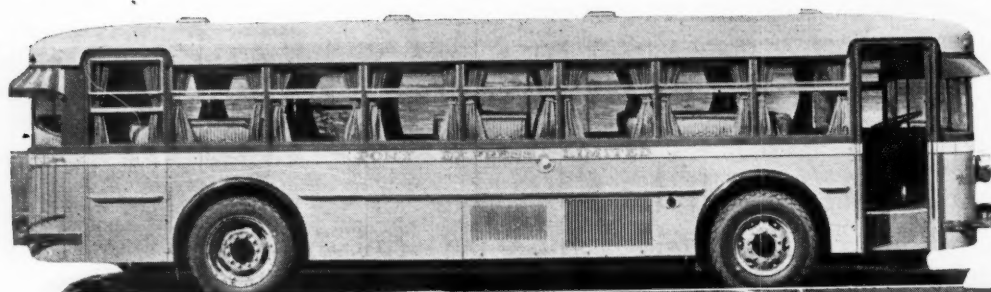
A new 27-passenger urban coach type built by ACF



The ACF 29-passenger parlor observation coach



ACF 40-passenger metropolitan coach



A 37-passenger parlor car built by Twin Coach Co.

of baggage storage and seating arrangement over the wheel housings.

A number of bus builders have eliminated the exterior baggage space and use racks along the sides of the bus directly over the seats. This arrangement permits each passenger to care for his own baggage and possibly adds to his sense of security. The exterior baggage compartment on the roof has not passed out, however, by any means, but present designs are a great improvement over those of a few years ago.

The most striking trend in the way of appearance is the large number of so-called observation type coaches exhibited. Even small buses designed for urban service are provided with the traditional awning at the rear and the highly polished guard rails which distinguish this type of body. While this trend might easily be carried too far there is no doubt that it does add considerable vigor and life to the appearance of what must at best remain a rather ungainly and not very beautiful object.

Color runs riot in bus paint shops. Passenger car makers believe that they enlisted the spectrum in their services, but compared with bus practice most passenger cars belong to undertakers. From a casual survey of the color combinations one is led to the conclusion that in many cases, at least, the aim of the colorist has not been necessarily the development of a thing of beauty but rather one which no prospective passenger could possibly fail to see coming down the road. The attempts to this end have been uniformly successful.

Some Outstanding Exhibits

Space does not permit full descriptions to be given here of all the new models displayed but the more interesting details of some of the outstanding exhibits can be mentioned.

The six-wheel bus exhibited by the Whitcomb Wheel Co., Kenosha, Wis., has been described in *Automotive Industries* (March 24, 1928), so that little more need be said of it here, although it was a feature of the show. Briefly, its features include an axleless front end with independently sprung front wheels; a rear end cradle construction by means of which the two rear axles are not rigidly attached to the body but are permitted to trail the front wheels to eliminate tire wear and to practically eliminate side sway when rounding corners; and a special type of body con-



Below—Interior rear of Twin Coach suburban express type, 41-passenger coach, showing exit door

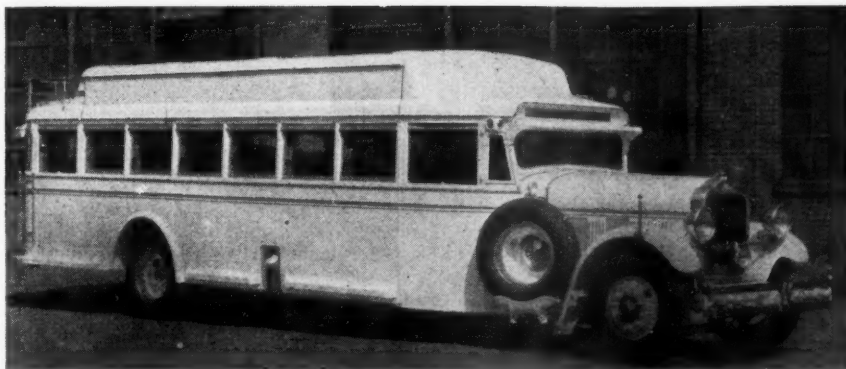
struction in which the chassis frame and body are built as a unit.

Twin Coach Co., Kent, Ohio, displayed two types of street railway equipment, a street car and a trackless trolley, which, except for the addition of a trolley pole, are identical in exterior appearance with the Twin Coach buses. The new trolley is an especially interesting design.

Automotive steering knuckles have been applied to steering the flanged trolley wheels along the rails, making possible drastic weight reductions, lower floor level and quieter operation. The four independent wheels are cushioned; semi-elliptic, automotive type springs are used and a worm drive and Timken roller bearings. One model spent the week running about the city on the tracks of the Cleveland Railway Co., and except for a particularly penetrating automotive type warning signal with which it was equipped, it added no appreciable noise to the usual traffic din. In fact, 100 ft. away it was impossible to hear the car when going by at city operating speed.

The new trackless trolley is a Twin Coach with pneumatic tires but equipped with a trolley pole through which it draws operating energy. In practically all other respects it is a Twin Coach bus. In fact the company states that 80 per cent of structural units of this job are interchangeable with either the bus or the Twin Coach trolley car.

General Motors Truck Co. showed for the first time a Model W, Yellow Coach chassis which is powered with a modified Cadillac eight-cylinder engine. Features of this new chassis include hydraulic four-wheel brakes; an 8-in. frame with seven cross-members—three of them tubular; an outboard mounting for the front springs which permits a lower frame level, better balance, relief to the wheel bearings and protection to the steering gear from road shocks; and an underslung worm drive axle. This model chassis replaces the Model X formerly built.



The new White 240-in. wheelbase, 33-passenger coach with Bender body has space provided inside the coach for luggage

Another addition to the Yellow line is a 240-in. wheelbase chassis in the Model Z line which is powered with a Yellow Sleeve Valve six-cylinder engine. A number of detail refinements have been made in this model besides lengthening the wheelbase.

The new Graham models feature a new front spring linkage in which the front shackle is attached to the air spring bottle to eliminate shimmy and wheel wobble and to provide better control. Two-stage springs are also provided as well as a Bragg-Kliesrath booster brake mechanism.

An interesting exhibit was the observation parlor car shown by American Car & Foundry Co. in which the "observation" part consists of an elevated rear seating section from which passengers can look out over the roof of the front of the bus and obtain a splendid view ahead. The space under the observation platform is utilized for baggage storage and this model, by the way, is about the only one where the disposal of passengers over the wheel housings has been made with complete satisfaction, since their seats are several feet above the housings.

In one or two jobs folding seats were provided in the center aisle for emergency use so that what was ordinarily a 29-passenger bus might accommodate as many as 36 passengers if necessary. A number of buses with baggage space on the roof are fitted with folding steps instead of permanent ladders to give access to the baggage. Wicker covered, steel frame chairs with leather upholstery was the most usual style found in the buses on display.

Interior trim of genuine walnut or mahogany veneer, or steel panels finished to resemble veneers, were found more frequently in de luxe buses than paint and varnish surfaces. In at least two models shown a lavatory was provided which was considerably smaller than that of a Pullman car.

Ventilation Receives Attention

Ventilation has received considerable attention and cowl and roof ventilators in addition to several patented systems were employed in various combinations to provide fresh air for the passengers. Some makers, in trying to surmount the wheel-house problem, have placed the wheel-house seats to face backward to form a compartment in the rear. In some jobs the rear seats are all revolving and adjustable so that a card table may be set up.

The appointments in a Bender body mounted on a White chassis were particularly complete and included a radio as well as a lavatory, rear smoking compartment and carpet on the floor, besides all the more usual features of de luxe coaches.

Studebaker has two brand-new models on display, one a 12-passenger observation type urban coach mounted on a 75 Junior chassis and the other an interurban job on a lengthened 75 chassis. This body—a Superior job—had closed baggage compartments on each side of the roof which were divided longitudinally by a raised ceiling, giving a full 6-ft. clearance over the aisle.

Several Versare models were exhibited with the engine and generator of the gas-electric drive being placed crosswise of the frame in the rear.

Other companies exhibiting buses and bodies containing many interesting features which space limitations prevent being described in detail were the Anderson Body Co., Bender Body Co., Fitzjohn Mfg. Co., Fremont Metal Body Co., Frazer Electric Transmission Corp., Graham Bros., International Motor Co., and the Lang Body Co.

Municipal Traffic Ordinance

AFTER several months of work, the Committee on Municipal Traffic Ordinances and Regulations of the National Conference on Street and Highway Safety has molded the new Model Municipal Traffic Ordinance into final shape and is proceeding with the printing and distribution. It will be recalled that a tentative draft of the ordinance was completed last spring, and an article summarizing its provisions was published in *Automotive Industries* of May 12, 1928.

The ordinance in its final form differs in a number of cases from the tentative draft. Most of the changes are of minor character although in several instances important modifications were made. The tentative draft, for example, was neutral as between the use of three colors and two colors for traffic signals, but the ordinance now provides definitely for three colors—green, red and amber.

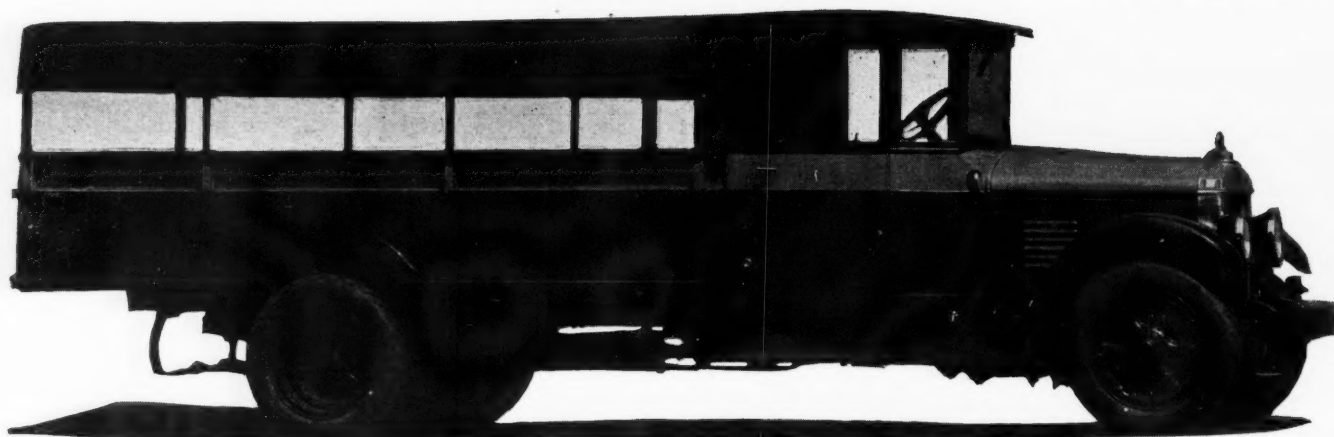
The provisions in the tentative draft authorizing overtaking of cars on the right were stricken out. The prevailing opinion was that whether or not this is a safe practice is at least open to serious question and that in view of the fact that neither the Uniform Vehicle Code nor any existing state law sanctions it, it would be unwise to recommend it. A considerable number of the members of the committee were convinced that it is essentially an unsafe practice.

The permissive provision authorizing a pedestrian about to cross a roadway so to indicate by holding up his hand was stricken out as of doubtful value.

The suggestion that vehicles be permitted to stop momentarily to load or unload passengers at certain points where anything more than a momentary stop would be objectionable, was stricken out.

The right of way rule (included in the state law provisions that may be repeated or inserted in municipal ordinances) was modified and gives the vehicle first entering an intersection the right of way and giving the vehicle on the right a prior right only when the two are entering the intersection at the same time.

To the list of prohibited places for stopping was added a space of 30 ft. in front of stop signs where such stopping would obscure the sign.



Mack Model BB 1½-ton speed truck with express body

New Mack Truck Fitted With *Hypoid Bevel Gear* Final Drive

Fast 1½-ton chassis designed for heavy delivery and tankwagon service. Four-cylinder engine same as used in AB model.

Wheelbase is 165½ in. Brakes are four-wheel type.

By P. M. Heldt

THE International Motor Co., New York, has added to its line of commercial vehicles the Mack Model BB, a high-performance 1½-ton truck which is expected to find its chief fields of application in heavy retail and special wholesale delivery, as well as in oil distribution in the form of a small tankwagon. Generally speaking, it represents an attempt to meet the demand for livelier performance in this line of transportation.

The engine is the same as that used in the AB trucks. It is a four-cylinder engine with block-cast cylinders and twin aluminum cylinder heads, with a bore of 4¼ and a stroke of 5 in. At 1400 r.p.m. it develops 45 hp. and at the governed speed of 2000 r.p.m., 56 hp.

A fuel tank of 30 gal. capacity is located under the seat, with a filler tube and fuel level gage projecting from the cab on the right hand side. Fuel feed to the carburetor is by a duplex electric pump. A complete 12-volt electric system is included in the standard equipment. Aside for the Exide battery the system is of North-East make. Ignition is by North-East battery system. The generator has a rated output of 135 watts and the items of electrical equipment aside from the generator and starter include Tiltray headlights, parking cowl lights, an instrument light, an ammeter on the instrument board, a tail-light and a horn. The battery is mounted on one of the running boards, and the tool box is carried on the running board on the opposite side.

The radiator is of the finned tube type with cast aluminum upper tank. It has a rubber mounting. The pump is of the gear-driven centrifugal type. Back of the radiator is mounted a four-bladed fan 19 in. in diameter with blades 2¼ in. wide, which is driven through a V-type rubber belt of 1⅞ in.

width on the outside. Belt adjustment is effected by means of a movable pulley flange. The fan is driven at 2-1/3 times engine speed. The total capacity of the cooling system is 6½ gal., of which the radiator holds 2¾ gal. the engine jacket 3 gal. and the connecting hose, ¾ gal. A thermostat and a Moto Meter are standard equipment.

The clutch is of the multiple-disk type and the transmission is the same as that used on the AB bus, which gives four speeds forward and one reverse. Ratios of the four forward speeds are 4.85:1, 2.62:1, 1.76:1 and 1:1. A feature of this transmission is that both the primary and secondary shafts are supported on ball bearings. The driveshaft through which the power is carried to the rear axle is in three parts. Of these the most forward one is a Spicer 500 series shaft with a Mack torque insulator with six rubber blocks at the rear. The intermediate part consists of a short shaft supported in two ball bearings carried on a tubular frame cross-member. A flange is fitted to each end, with a 500 series Spicer universal joint at the rear end and the torque insulator at the front. A disk-type transmission brake or propeller shaft brake is carried by the intermediate bearing on the propeller shaft. This brake is of the four-shoe type.

Pinion Mounted Above Axle

A hypoid bevel gear final drive is used, and this probably represents the first application of the hypoid gear to commercial motor vehicles. Whereas the pinions of hypoid bevel gear drives on passenger cars are generally mounted below the axle center, in this case the pinion is mounted above the axle, for the reason that the motor truck requires a comparatively high frame and the over-mounting is advanta-

geous also because it gives a straight-line drive under full load conditions. The chief reason for the selection of the hypoid gear in this case was that it permits of the high reduction ratios required in a single reduction. It is, of course, also more silent than a straight bevel gear drive, and as compared with a double reduction drive it is simpler, lighter and more efficient.

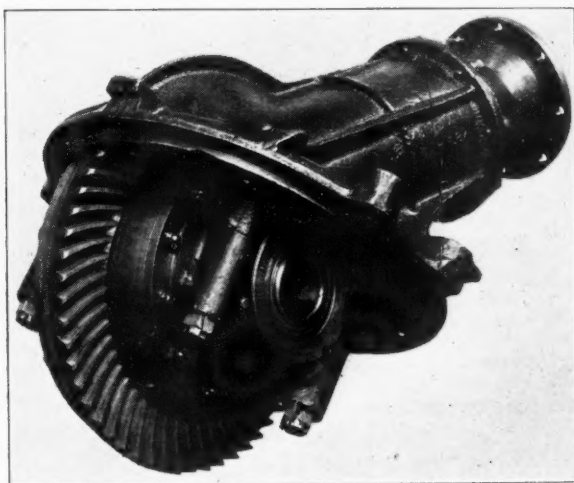
Full Floating Rear Axle

The rear axle is of the Mack full-floating type, the housing being a drop-forging of chrome nickel steel, heat treated. The center ring is set at an angle of 45 deg., the object in setting the ring at this angle being to make it possible to use the maximum size of ring gear together with the greatest possible road clearance. An incidental advantage is that the stresses due to road shocks come substantially in the direction of maximum strength of the axle housing. Three different gear ratios are being offered, viz.: 4.91, 5.88 and 6.87. These ratios are speeds of 38.8, 32.3 and 27.7 m.p.h. at 2000 r.p.m. of the engine.

Front axles are of the conventional I-beam section but that portion of the axle forging between the spring seat and the axle end is of rectangular section with a flange at the top, the vehicle being equipped with four-wheel brakes, which made it necessary to design the front axle so as to enable it to take the braking torque due to the front brakes. Center point steering is used and the general design is that of the AK front axle, which is lightened, however.

The four-wheel service brakes are actuated directly through the brake pedal and through a very simple connecting linkage without equalizers, though there is a brake proportioner between the front and rear brakes. The front brakes measure 17 by 3 in., the rear, 17 by 4 in., giving a total of 504 sq. in. of braking surface. In order to reduce the necessary pedal pressure to a minimum, the brake cross shafts and camshafts are mounted on Hyatt roller bearings. The emergency brake is a disk brake mounted on a drive shaft.

The frame is of the usual pressed steel type with 6-3/16 by 2 1/4 by 1/2 in. side rails. These dimensions



Hypoid drive gears and gear carrier

apply to the section at the middle of the side rails, which taper down to a section 4 in. high over the rear axle, this latter section being 36 in. long. There are four tubular and one channel-section cross-members, the latter being located at the rear. At the

engine rear support the frame side rails are further tied together by an underslung T-section cast-steel engine bearer. The frame is 33 1/4 in. wide, has a total length of 233 1/2 in. and an overhang over the rear axle of 52 1/2 in. Following are some of the more important dimensions of the chassis: Front of radiator to rear of cab, 95 1/2 in.; rear of cab to rear axle axis, 80 in.; rear of cab to rear end of frame, 132 1/2 in.; front of radiator to cowl, 44 in.; cowl to rear end of frame, 184 in.; overall length of chassis 246 in.

A worm-and-worm-wheel type of steering gear is employed, with a five-spoke cast aluminum spider and a 20-in. molded rubber wheel. The ratio of the gearing is 10 to 1 and the front wheels can be moved from hard over one way to hard over the other way by 1-4/5 turns of the hand wheel. The steering post is set at an angle of 48 1/2 deg. to the vertical, which assures greater comfort of the driver than a more nearly vertical column. The minimum turning radius is 32 ft. 6 1/2 in. for a left-hand turn and 32 ft. 2 in. for a right-hand turn.

Reverse camber half-elliptic springs are used all around, the term "reverse camber" signifying that the springs become absolutely flat before the load reaches the full nominal value, so that under full load the spring leaves form arches. At the rear there are helper springs which come into action in two successive steps. Rubber shock insulators are used at both ends of each main spring.

Stream-lined Hood

The hood is stream-lined to the cowl and provided with horizontal louvres. Cowl and dash are standard equipment. A deluxe type weatherproof cab is furnished at extra cost. It seats three and is fitted with a swinging windshield and side cowl ventilators. The cab is fixed at the front and supported on rubber at the rear. An electric windshield wiper comes with the cab, which latter has an outside width of 53 in.

The BB model is furnished in one length of wheel-base only (165 1/2 in.) and the truck is made to be mounted only on pneumatic tires and not for use as a dump truck. The tread is 62 1/2 in. in front and 63 3/4 in. in the rear. Thirty-two by 6 in. tires are carried all around, single in front and dual in the rear. A spare tire with rim is carried underneath the rear part of the frame. The wheels are of the steel-spoked type.

An express type of body is furnished at extra cost, its inside dimensions being as follows: Length, 144 in.; width, 70 in.; height to bows, 48 1/2 in. It overhangs the rear end of the frame 15 in. and the rear axle center, 67 1/2 in.

In addition to the items of standard equipment already listed, mention should be made of the pressed steel front bumpers and of the full fender equipment. The front fenders are crowned and the running boards extend to the rear line of the cab.

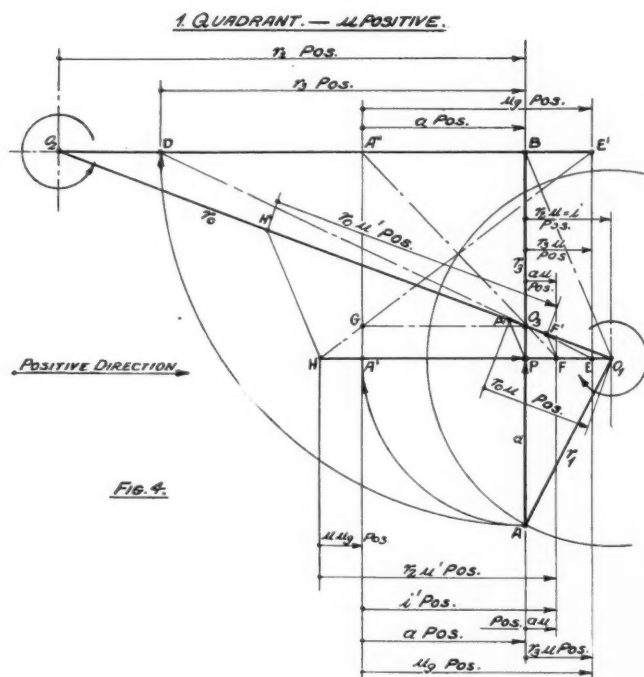
Correction

IN the article "Scuffing of Tires is Studied as Source of Wear," in our issue of Sept. 1, last, which was based on an article on "Measurement of the Tread Movement of Pneumatic Tires and a Discussion of the Probable Relation to Tread Wear," in July issue of the Bureau of Standards Journal of Research, the latter article was erroneously credited to Percy H. Walker and E. F. Hickson. The authors of the article were W. L. Holt and C. M. Cook.

How Motion of a be Analyzed

Part 3—A Further as Applied to En

By William



IN Fig. 3, published with the second instalment of this article, last week, the three magnitudes i' , u and u_0 contained in the expression for $r_2 u'$, were developed in a logical way. For practical use, however, this diagram should be simplified, particularly with a view of grouping those elements which may be either positive or negative, so that not only the elements, but also the final expression $r_2 u'$ could be read off the diagram directly without any intermediate reading. For every reading introduces a reading error, and it also interrupts the continuity of the procedure. Furthermore, it was felt that the final result should not be given in the form of $r_2 u'$, with a different value of r_2 for every position, but rather in the form $r_0 u'$, r representing the fixed distance $O_1 O_2$, which in a cam mechanism is the distance between the center of the cam shaft and the center of the lever shaft. Thus by either making the scale of the diagram such that $O_1 O_2$ will be equal to unity, or by merely considering it so u' could be read directly off the diagram.

It was with this end in view that Fig. 4 was evolved. It is in all respects similar to Fig. 3 and will be readily understood from the latter.

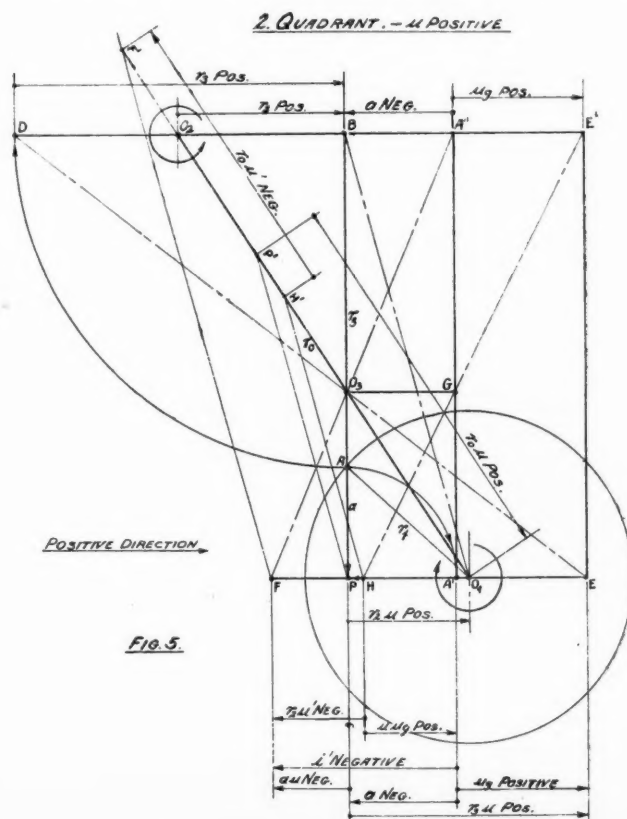
Direction of Rotation Defined

Before explaining the diagram, we wish to define the direction of rotation. It has been stated that the cam or the eccentric disk rotates clockwise. This, however, is a loose definition, since the same mechanism, viewed from the opposite side, moves counter-clockwise. We must define the eccentric movement with respect to the lever pivot. The eccentric disk, rotating as in Fig. 3, would produce a frictional pull on the lever, while, when rotating in the opposite direction, it would push the lever against the pivot pin. Accordingly let us call a rotation as in Fig. 3 a pull rotation and the opposite rotation a push rotation.

In Fig. 4, instead of swinging the different magnitudes appearing on the lower parallel into line with a , we swing a into line with these different magnitudes and proceed as follows: Plot the eccentric and lever positions marked by the points O_1 , A , B and O_2 , by the distances r_1 , r_3 and r_0 , and with ABO_2 forming a right angle. $O_2 B$ equals r_2 . Connect O_1 and O_2 by the straight line $O_1 O_2 (= r_0)$, intersecting $BA (= r_3 \text{ in } O_3)$. Draw a

parallel to $O_2 B$ through O_1 . This "lower parallel" intersects BA at P . PO_1 equals $r_2 u$ and PA equals a . Strike in pull rotation an arc of radius $BA (= r_3)$ around B , intersecting BO_2 at D . Likewise strike in pull rotation an arc of radius $PA (= a)$ around P , intersecting the lower parallel at A' and by its vertical tangent in A' intersecting the upper parallel at A'' . Draw ray DO_2 intersecting the lower parallel at E and ray $A''O_2$ intersecting the lower parallel at F . PE equals $r_3 u$ and PF equals au . $A'E$ equals u_0 and $A'F$ equals i' . Draw a vertical through E , intersecting the upper parallel $O_2 B$ at E' , and a horizontal through O_2 intersecting $A''A'$ at G . Draw ray $E'G$ intersecting the lower parallel at H . HA' equals $u u_0$ and HF equals $r_2 u'$. (For G , a focal point like O_2 , reflects $A''E' = u$ as $A'H = u u_0$.)

To convert the expressions $r_2 u$ and $r_2 u'$ into the handier expression $r_0 u$ and $r_0 u'$, draw $O_1 B$ and parallels to $O_1 B$ through P , H and F intersecting $O_2 O_1$ at P' , H'



Mechanism May Geometrically

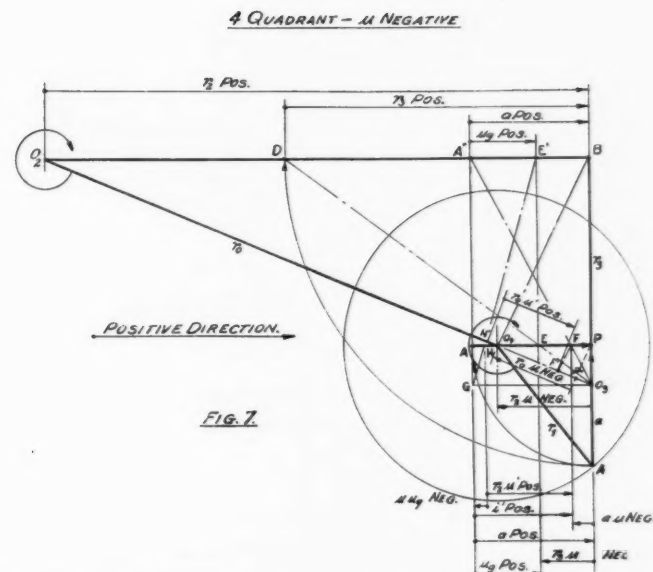
Study of the Method gine Valve Cams

Samuels

and F' respectively. Then $P'O_1 = r_o u$ and $H'F' = r_o u'$.

In the above directions the terms "vertical" and "horizontal" are used with reference to AB (vertical) and O_2B (horizontal).

By following these directions, we will find the final values $r_2 u$ and $r_2 u'$ and, still better, the converted values $r_o u$ and $r_o u'$ for any position of the eccentric disk (or cam). However, since the appearance of the diagram changes considerably in the different positions, we give in Figs. 5, 6 and 7 the diagrams, corresponding to Fig. 4, for the remaining three quadrants. The term "quadrant" is used here with reference to the position of A to a coordinate cross, having O_1 as vertex and the "lower parallel" as axis of abscissas. For an investigation of this kind, it is suggested to use the four diagrams alternately like a road map, as the suc-



cessive positions of the mechanism appear in the four quadrants.

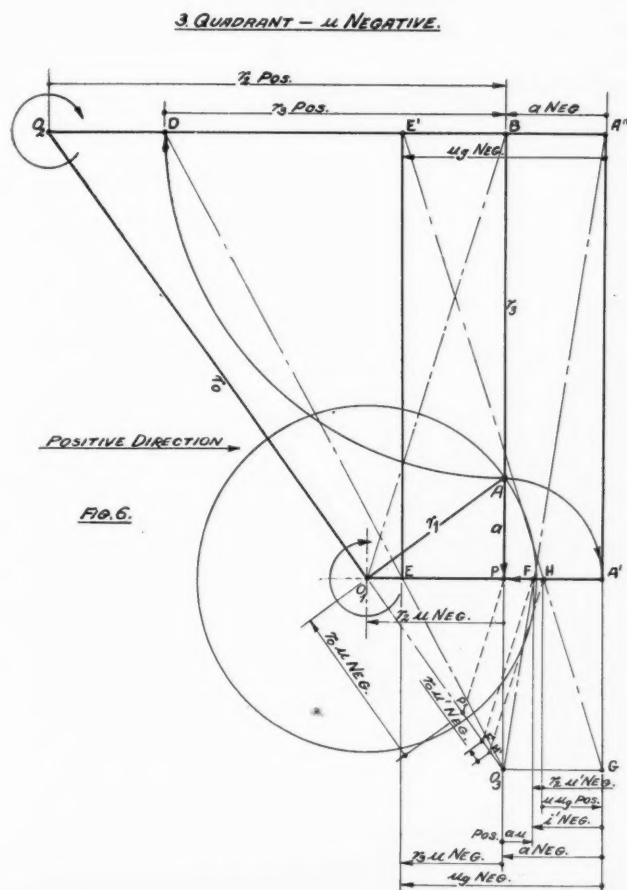
In laying out a set of diagrams, it is entirely unnecessary to consider the meaning of the intermediate points and lengths. On the finished diagram we take notice only of the length $PO_1 = r_2 u$ and $HF = r_2 u'$, or, still better, of $P'O_1 = r_o u$ and $H'F' = r_o u'$. We must, however, determine the sign of these ultimate lengths, and to that end a direction arrow is drawn on each of the four diagrams. It will be noticed that the horizontal positive direction is from the lever pivot O_2 to the contact point B . This is the positive direction for $r_2 u$ and $r_2 u'$. Correspondingly, the positive direction for $r_o u$ and $r_o u'$ is from lever pivot O_2 to shaft center O_1 . With these positive directions we have to compare the directions of PO_1 and HP or, for an easier result, $P'O_1$ and $H'F'$. And in making the comparison, we must read the lengths from P to O_1 , from H to F , from P' to O_1 , from H' to F' .

Same Diagrams for Push Rotation

These direction rules apply to a mechanism moving in pull rotation, for which our diagrams were laid out. The very same diagrams can be used to determine the velocities and accelerations for push rotation. That means, the diagrams must be laid out as directed, irrespective of the direction of rotation. "Strike arc in pull rotation," in the directions therefore applies also if the eccentric or cam has push rotation. Nor is it necessary to reverse the direction arrow. The only difference is that now we must read off the speed reduction $r_2 u$ (or $r_o u$) from O_1 to P and from O_1 to P' . The accelerating reduction $r_2 u'$ (or, better, $r_o u'$), however, are read off from H to F and from H' to F' for both rotations.

The reason for this will be made clear by a perusal of Figs. 8 and 8^a. Fig. 8 is a diagrammatic picture of an eccentric disk and straight lever mechanism in 16 successive positions at regular intervals, in addition to the two dead center positions $U.D.C.$ and $L.D.C.$ For each position, the magnitudes $r_o u$ and $r_o u'$ were determined as per directions. By considering the distance r_o from the center of rotation to the swing center to be 100 per cent, the length of the $r_o u$ and $r_o u'$ lines give u and u' directly in percents. In the two full line curves of Fig. 8^a these values of u and u' are plotted against the angles of rotation for a complete revolution of the eccentric disk from the lower dead center.

As might be expected, the u curve passes through the



zero line in the dead center positions and reaches its maximum and minimum, when the u' curve passes the zero line. Fig. 8^a also contains the lift curve of the lever. This curve could be found directly from Fig. 8 by striking an arc of unit radius around the fulcrum and measuring the lengths representing arcs, cut off by the lever line in its different positions, in the same unit. For pull rotation, the values of the three curves, represented by their ordinates, succeed one another, as we read them from left to right. It is clear that for a certain position of the eccentric, the lever can have only one position, no matter by what movement the eccentric was brought into this position. Consequently, the lift curve applies for pull and push rotation. Only the ordinates for push rotation follow each other as we read them from right to left.

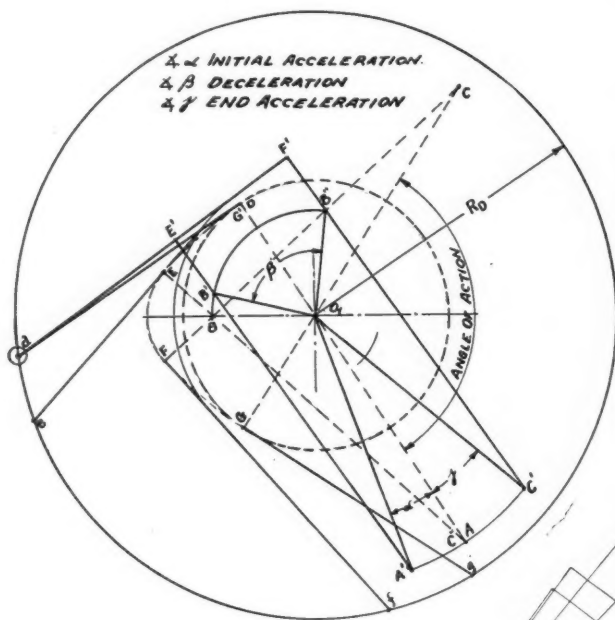
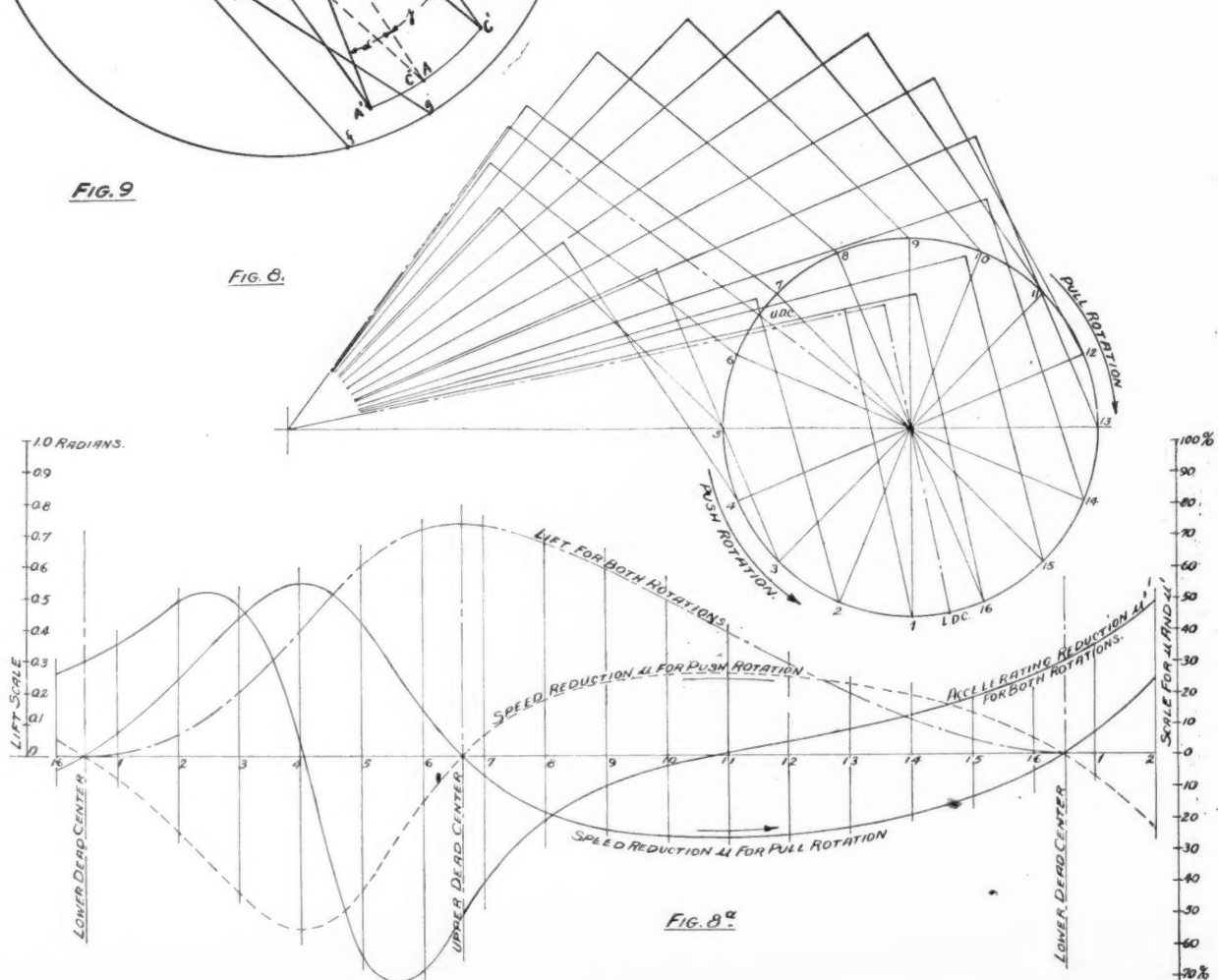


FIG. 9

FIG. 8.

FIG. 8^a

The speed for any position, let us say position 14, is given by the inclination of the tangent on the left curve at ordinate 14. There being only one tangent, the absolute value of the speed must be the same for both rotations. But what is a decline for a reading from left to right is an incline for a reading from right to left. Consequently, the speed (and with it the speed reduction) has the opposite sign for push rotation than for pull rotation. It follows then that the u curve for push rotation is symmetrical to the u curve for pull rotation, the axis of abscissas forming the axis of symmetry. The accelerations for the same position 14 are given by the inclinations of tangents on the full line and dotted line u curves respectively at ordinate 14. These two curves being symmetrical, their two tangents must intersect the axis of symmetry at the same point. That means, in an absolute sense at least, they have the same incline. Furthermore, it is easy to perceive that the tangent on the full line u curve at ordinate 14, for a reading from left to right, is on a positive incline the same as a tangent on the dotted line u curve at ordinate 14 is on a positive incline for a reading from right to left. Consequently the same sign for w' and the same u' curve applies for both rotations. Only, for pull rotation we read from left to right, for push rotation from right to left.

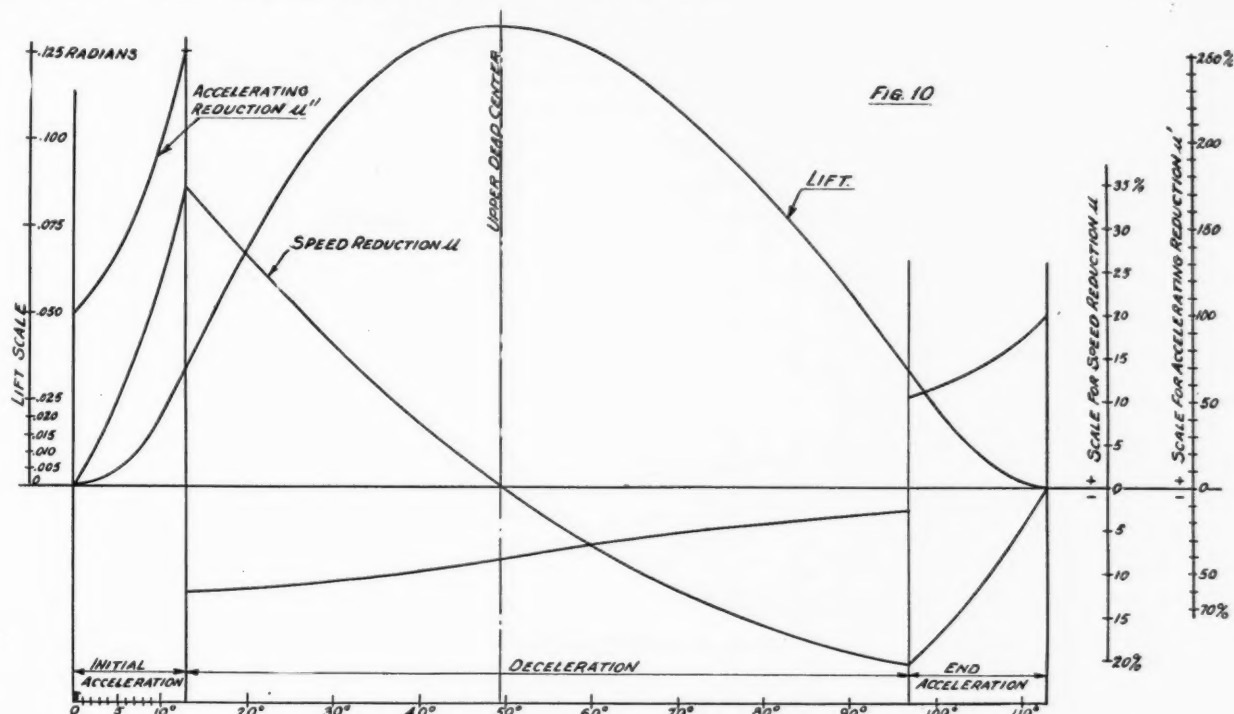
We are able now to apply the above rules for an eccentric disk and straight lever mechanism to a cam and straight lever mechanism.

It was stated in connection with Fig. 2, that the imaginary cam actuating the straight lever O_2P is a combination of three eccentric disk sectors, and it is therefore necessary to determine the angle of action

and its position relative to O_2 , for each sector. This is done in Fig. 9.

The imaginary cam with center O_1 is shown by a dotted line. A is the axis of the first flank radius R_2 , corresponding to point Q_2 in Fig. 2. B is the axis of the nose radius R_2 , and C is the axis of the second flank radius R_2 , corresponding to point Q_2' in Fig. 2. Con-

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necting line AO_1 intersects the cam outline at D . AB intersects at E , CB at F and CO_1 at G . D , E , F and G are the points of tangency of the four arcs that compose the cam outline. We must know the distance of each point of tangency from the fulcrum O_2 at its moment of engagement. Therefore, we draw a circle of the radius R_2 around O_1 , R_2 equaling $O_1O_2 = D$ in Fig. 2. A left perpendicular to AD in D intersects this circle in d , a left perpendicular to AE in E intersects in e ; a left perpendicular to CF in F intersects in f and a left perpendicular to CG in G intersects in g . (For the meaning of "left" refer to Fig. 9).

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If now we connect points A , A' , B' , B'' , C' and C'' with O_1 , we have, in proper relation to the fulcrum d , the following angles: AO_1A' ($= \alpha$) is the angle of rotation of the first flank eccentric disk during the initial acceleration period. $B'O_1B''$ ($= \beta$) is the angle of rotation of the nose eccentric disk during the deceleration period and $C'O_1C''$ ($= \gamma$) is the angle of rotation of the second flank eccentric disk during the end accelerating period.

It is worth noting that there are several checks for correctness and exactness in Fig. 9.

For each of the three periods of the cam motion, in addition to the end positions at least two intermediate positions should be "diagrammed" to determine their u and u' -values. This was done for the mechanism shown in Fig. 2 and 9 and the results are plotted in Fig. 10.

It may be stated here that the diagrammed values came out with remarkable precision. No "doctoring" was necessary to make the different branches of the line drafts match up with each other, a result which speaks well for the method.

The upper dead center (or full valve opening) is reached early in the case of pull rotation. This is a desirable feature for the intake valve of a four-cycle engine because the piston speed reaches its maximum value before the stroke is half completed, but less desirable for the exhaust valve, as during the return stroke the piston speed reaches its maximum value at a point beyond half-stroke. Consequently, a symmetrical cam gives good opening diagrams with an intake valve if it has pull rotation, and with an exhaust valve if it has push rotation, whereas a suitable unsymmetrical cam is preferable for an exhaust valve if the cam has pull

(Continued on page 455)

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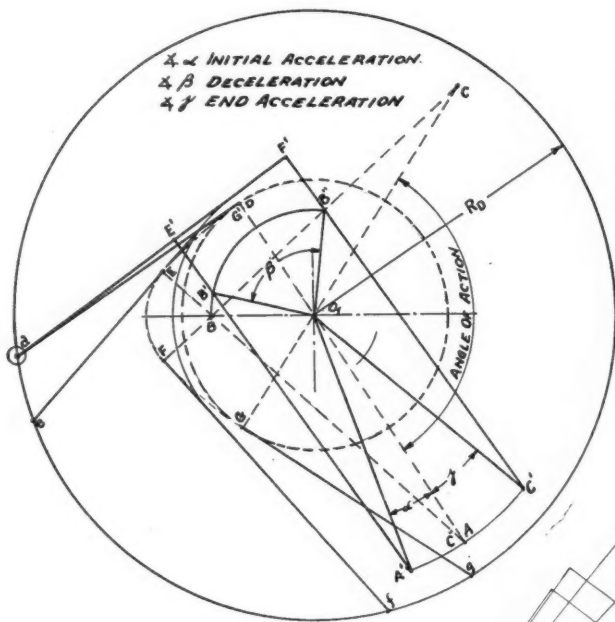
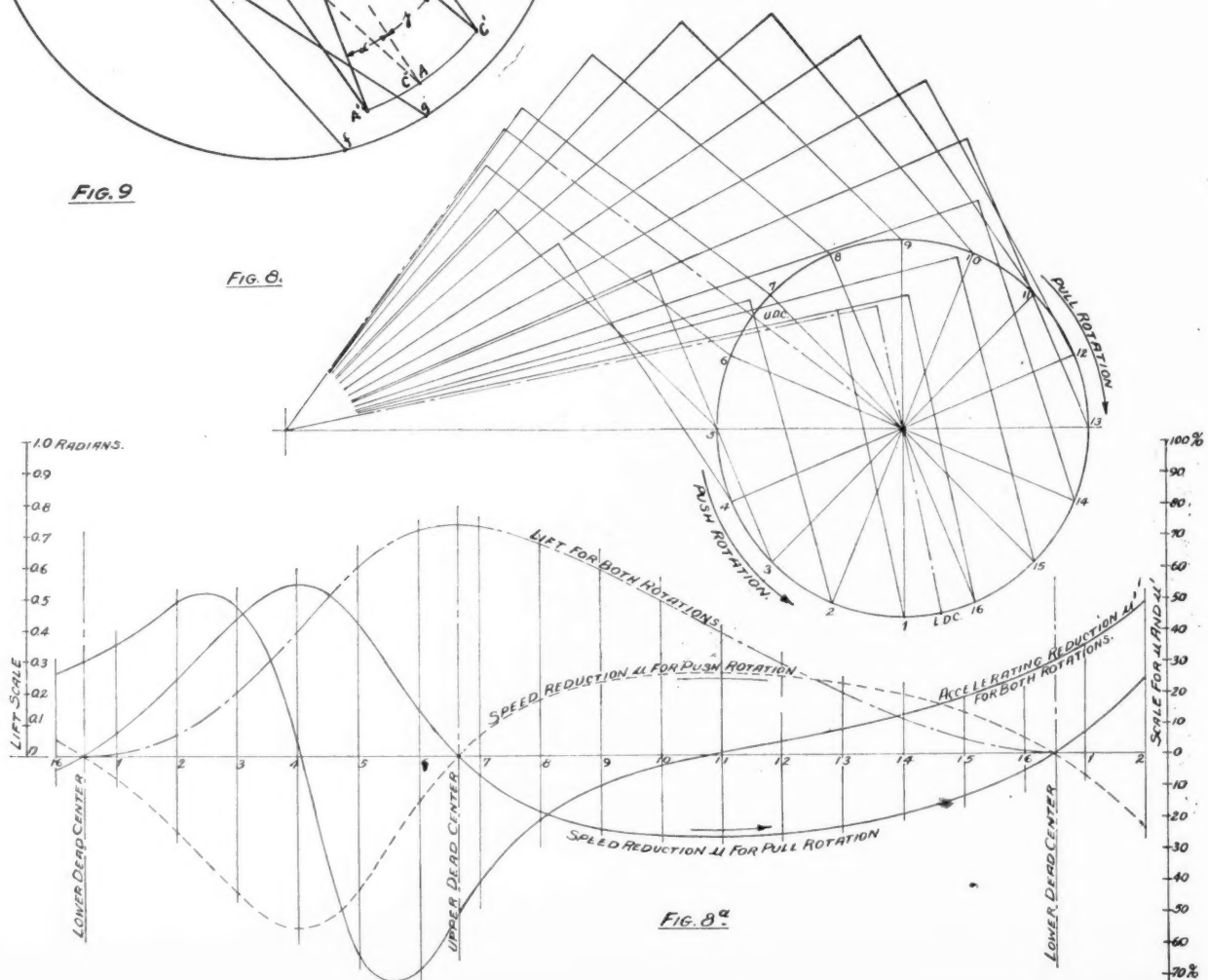


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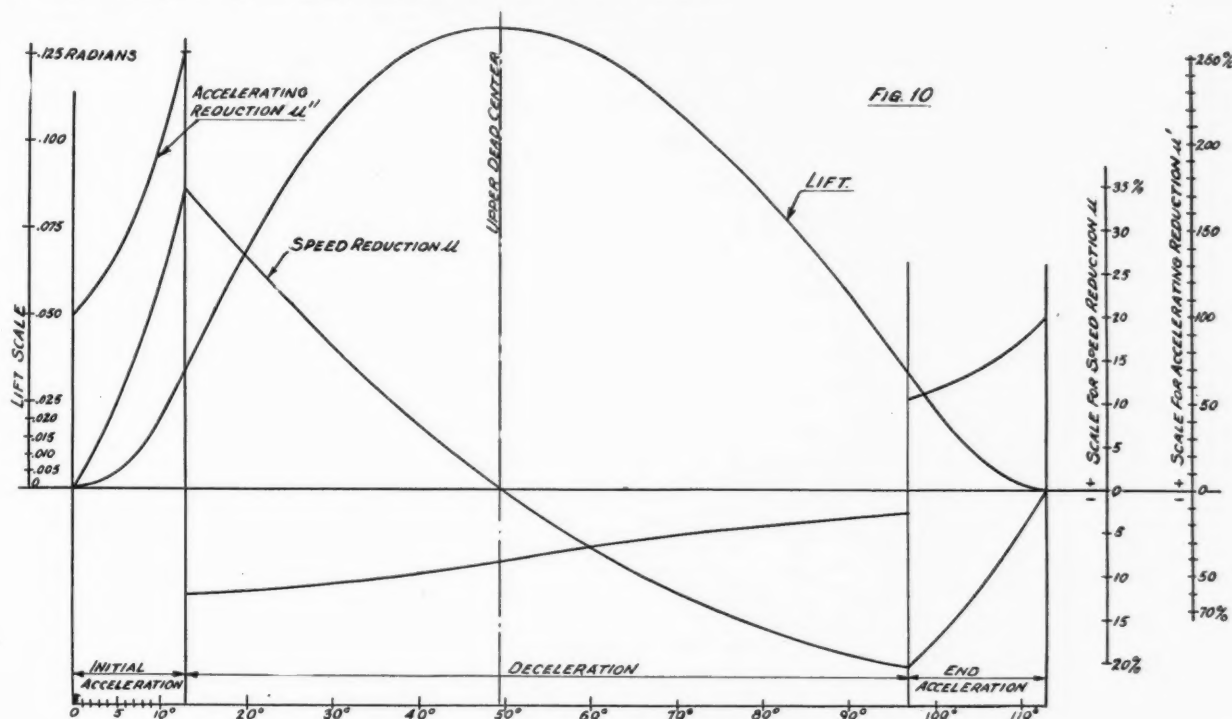
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THIS is the last of a series of three articles by Mr. Samuels dealing with the geometrical analysis of mechanical motions. The other two articles appeared in *Automotive Industries* of Sept. 15 and Sept. 22. In the first article the method was explained and its application to a crank motion shown, while in the last two articles the application to a cam motion is illustrated.

Mergers Should be Based on Desire to Give Public *Better Value*

Amalgamations carried out with interests of consumer in mind more likely to survive and flourish than those prompted by vanity or by the opportunity for personal gain.

By C. S. Davis

Chairman of the Board, Borg-Warner Corp.

WHAT is the present situation in the automobile trade with reference to mergers? Are the smaller car makers going to merge in the effort to strengthen their position against their larger competitors? Are certain of the larger car manufacturers going to unite and form a second or a third combination of the General Motors type? Are parts makers going to combine in the attempt to make themselves stronger and more valuable to the trade? Or will the mergers tend to the vertical type, that is a combination of various units producing raw materials, component parts, and finally the finished car?

Or, again, has our industry reached the stage where further merging of its units would be without economic value?

I will confess that these questions are too large and complicated for me to dare an off-hand answer. I cannot see in current trade events any definite trend, and the type and character of the autom-

otive mergers already in effect vary too widely to predicate the future on what has already happened. The only important common feature discernible among the automotive mergers that have endured is one of effect, rather than form. It is the ability to effect economies in production and distribution, the benefits of which have been largely passed on to the consumer.

If then, we can find answers to our queries about the future, I think they will have to be sought out through reasoning from cause to effect—by considering, first, what the industry now needs; that is, what it lacks that would increase its efficiency; and secondly, what kind of merger, if any, could supply, or at least reduce, this present insufficiency. In short, I believe the mergers of the future must develop because they will fill either immediately, or eventually, an economic need.

If this theory is correct, then the automotive merger of the future will be of a type and character that is conceived with the public good definitely in mind, and the mergers that survive and flourish will be the ones that are organized in detail and managed with the interests of the consumer continuously and intelligently

considered above all other elements in the transaction.

It might be well at this point to consider briefly the motives that have brought about mergers or combinations in the past, and the various types and forms of corporate organization and management that have been developed.

As to the motives behind the formation of large mergers, we might attempt the following classification:

1. The personal ambition and vanity of energetic and capable men, who are driven by an irresistible love of power.
2. The desire of men to take advantage of opportunity for personal gain in the purchase of properties and refinancing operations.
3. The attempt to preserve or revive businesses through refinancing, or through union with stronger institutions.
4. The desire, from an investment standpoint, to diversify business risk and business opportunity.
5. The desire to pool or

to increase the available financial resources.

6. The desire to pool the energies of trained and capable men.

7. The desire to eliminate or minimize waste, through the increase of purchasing power, the centralization of manufacturing processes, the reduction of unnecessary or duplicated sales effort; and in general the substitution of constructive cooperation for uneconomic multiplication of human and mechanical energy.

We can, perhaps, all bring to mind instances where one of the motives outlined above has been the dominating reason behind a merger. You, doubtless, can recall some case where the personal ambition of some one masterful man has led to the absorption of various units. Also, we have had instances where stock-jobbing seems to have been the one big motive, and again, you credit men have witnessed the attempt of weak sisters to merge their liabilities with bigger liabilities, or, maybe, to find a stronger brother to lean upon. But these combinations have not endured. The empires of such ambitious super-men as Alexander and Napoleon were short-lived, and even Julius Caesar's gigantic merger had to be reorganized. Where personal gain has

IN this article, which is from an address delivered by Mr. Davis at the Credit Conference of the Motor and Accessory Manufacturers Association, at Buffalo, N.Y., Sept. 13, a very timely subject is discussed.

Mergers have been and probably will continue to be a part of the natural development of the automotive industry and it is well to understand clearly the various factors which affect their success. Mr. Davis makes a broad analysis of these factors and sets forth some interesting conclusions.

been the principal motive, the stock jobbers have not been conspicuously successful as business managers, and the institutions that accumulate big liabilities unaided can usually raise bigger ones when they join forces with similar organizations.

Of course, human motives are not single nor simple. In fact, we humans are rather complex animals and it usually happens that our motives are mixed. Therefore, it usually happens that the motives behind a merger are several. There may be a bit of personal ambition, and a bit of desire for personal gain mixed up with a strong, definite urge to build up large, prosperous business institutions founded upon intelligent, constructive principles. But whenever the merger is dominated by constructive motives, such as the desire to eliminate waste, to pool the efforts of capable men, or to increase and strengthen financial resources, we may predict success and long business life. The foundations are sound, and the career of such a merger is secure unless mistakes in the policies of organization and management are permitted to creep in.

Difficulty in Organization

I believe it is clear that the form of corporation organizations in mergers, and also the type of executive organization has, in the past, depended to a considerable extent upon the circumstances surrounding the formation of the merger. There has not always, perhaps only seldom, been a deliberate choice. Hence, even with well-chosen units, the exigencies surrounding their acquisition have led at times to considerable difficulty in establishing coherent working organizations, wherein authority and responsibility were nicely balanced between the central executive group and the unit groups. In extreme cases we have witnessed near failure because of this difficulty; and in one of the largest combinations it required several years to attain secure success, during which time there were necessary modifications in the original plan of organization, and radical changes in the executive personnel.

These observations tempt us to speculate on an ideal merger. First, I would eliminate from the reasons behind the formation of such a merger the more or less destructive motives which I mentioned earlier, namely, mere personal ambition and mere desire for personal profit through the transaction. I would eliminate also, of course, the desire for refinancing of units that could not on their own showing accomplish refinancing independently.

With the boards thus cleared, I would want to see certain other motives which we discussed definitely in action, and satisfied. Among these are the desire to pool and to thereby strengthen financial resources, the desire to combine and thereby strengthen the energies of capable men, and also the desire to diversify business risk and business opportunity.

But above all, there must be behind an ideal merger the opportunity of eliminating waste of human and mechanical energy, or at least an opportunity to reduce such waste to a minimum never before experienced in the trade.

Given the proper constructive motives and a real opportunity to reduce waste, I would then want to see our merger made up of well-chosen units, each of which could contribute to the strength and welfare of the whole. I would not insist that all of the units make a common product, although such a condition would of course afford the most immediate opportunity to reduce waste. And I do not think I would be favorable toward a so-called vertical combination made up of units pro-

ducing raw materials, finished parts and finally the completed product ready for the consumer, unless the raw material and the parts-making unit had an outlet for sales beyond the ability to consume offered by the units making the finished product.

In the specific choice of units, I think I would list the following qualifications as essential:

1. The unit must be a leader in its class with a well-developed sales field, capable of further expansion.
2. The ability to sell its product at a profit should be consistently shown over a reasonable period of years.
3. It must be well financed, or at least capable of financing its own needs.
4. The plant and machine tool equipment must be modern and adequate for economic production methods.
5. The men in the management of the unit should be capable and of good standing in their trade.
6. It would also be desirable that the securities of the unit be known to investors and marketable.

Units of this character would form highly desirable material in the formation of a merger, and I believe we could go further and say that any other character of unit would be undesirable.

And now, how would we like to see this ideal merger of ours accomplished? With a minimum of expense, I take it, for we certainly would want to show for each share of stock issued the biggest possible dollar's worth of value in property and earning power. We would, therefore, want to avoid expensive financing that involves the issuance of quantities of securities, on which interest and dividends must be paid, but which would represent only financing services rendered, and not have behind them current profit producing properties.

Therefore, I would like to see my ideal merger accomplished by an exchange of stock, with only a comparatively small amount of securities issued above the sum total of unit securities previously outstanding. And this could rather easily be accomplished if the units chosen already had outstanding securities with which the financial market is acquainted.

With a merger corporation so organized and with such units, fixed charges would be at a minimum, and I would feel rather confident, in view of the earning record of the constituent companies, that the new corporation would be able to meet its dividend requirements regularly, and at the same time accumulate a healthy cash reserve for expansion requirements and all other contingencies.

Strong Central Control

In this ideal merger, I would want the form of management organization to provide a central control strong enough to harmonize the activities and to add to the financial stability of the units. On the other hand, I would want the local management of the units to have authority and responsibility broad enough to preserve and foster their initiative to the fullest degree.

I would want to see this merger start on its career with a personnel containing several men capable of filling the chief executive offices of the central organization, and I would not have it contain one man of superability coupled with an over-weening destructive personal ambition.

Above all, I would want to have unanimous recognition by the men in control of this merger that they can build and maintain their institution only on the solid foundation of contribution to the public good, which, translated, means very simply that, while making reasonable profit for themselves, they must offer a better product at a lower price than the consumer can continuously buy elsewhere.

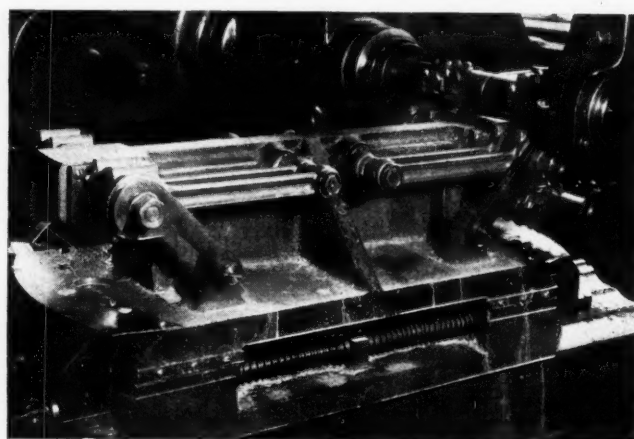
Cadillac Crank and Wrist Pin Holes Both Diamond Bored

Connecting rod manufacturing methods also somewhat unique in that all straightening is done previous to heat treatment. First operation on surface grinder.

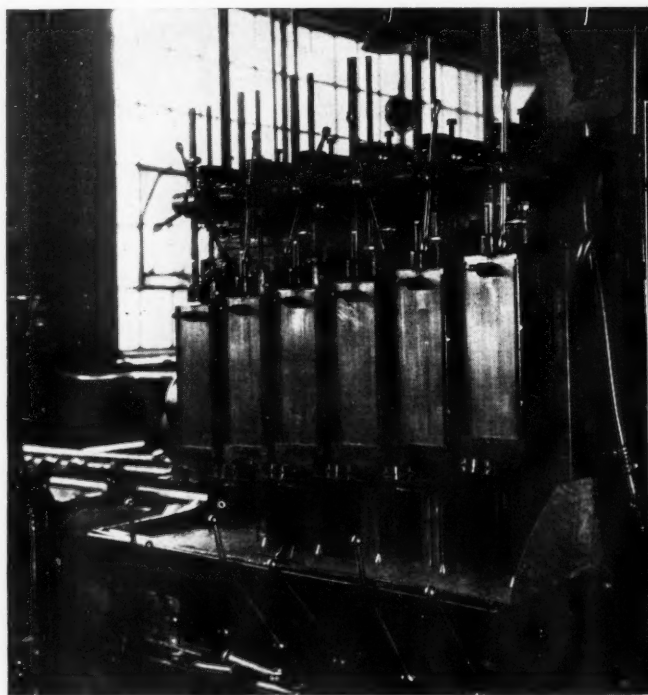
THE CADILLAC MOTOR CAR CO. is another of the relatively few manufacturers which does not believe in straightening connecting rods after they come from heat treatment. This is because it is believed that there is a tendency for a straightened rod to return to its original shape when it is subjected to engine conditions of alternate heating and cooling and to the shocks received from the compression and explosion forces on the pistons.

Cadillac methods of connecting rod manufacture are somewhat unique also in that it is one of the few concerns which diamond bores both the crank and the wrist pin holes. Both of these operations are performed simultaneously in a two-spindle machine designed by Cadillac engineers.

The first operations on the connecting rod forging are those connected with heat treatment and the rod



A duplex milling machine is used to form mill bolt bosses. The indexing fixture holds eight rods, four being milled at a time



General view of one of the four specially-designed, six-spindle machines used for gun drilling oil holes in rods

is annealed, straightened, heat treated, pickled and tested for hardness.

The first machine operation employs a surface grinder to rough grind the crank pin and wrist pin bosses which are then used for locating the rod



Bolt holes are drilled and reamed in multiple-spindle drills with fixtures holding eight rods. Two drilling stages, a reaming and a loading operation are provided. Production is 60 rods per hr.

in a six-spindle drill press where the crank pin hole is rough drilled.

Another locating spot is milled on the bottom of the crank pin boss in a hand mill and this spot, with the parallel boss surfaces, is used to locate the rod in four-spindle drill presses where the crank pin hole is semi-finish bored and reamed.

The crank pin hole is then chamfered in a drill press and operations are commenced at the small end. The bored and reamed crank pin hole is employed to locate the rod in four-spindle drill presses where the wrist pin hole is drilled and rough reamed. After this the hole is chamfered in another drill press.

Two milling operations follow—one, in plain automatic milling machines, in which a radius is milled on the bearing cap; and the other, in special milling machines, profiles the groove in the cap. The bolt lugs are then form milled in automatic duplex milling machines equipped with formed milling cutters.

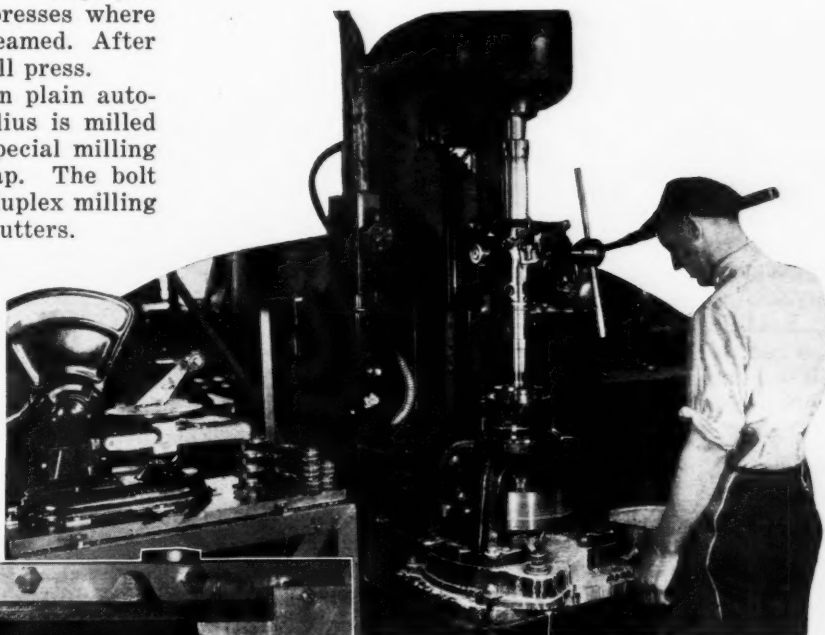
A flat on the bolt lug is ground on a disk grinder. This flat is used for identification marks, to avoid mixing the rods and caps.

In drill presses the wrist pin boss is hollow milled and then it is profile milled in vertical milling machines.

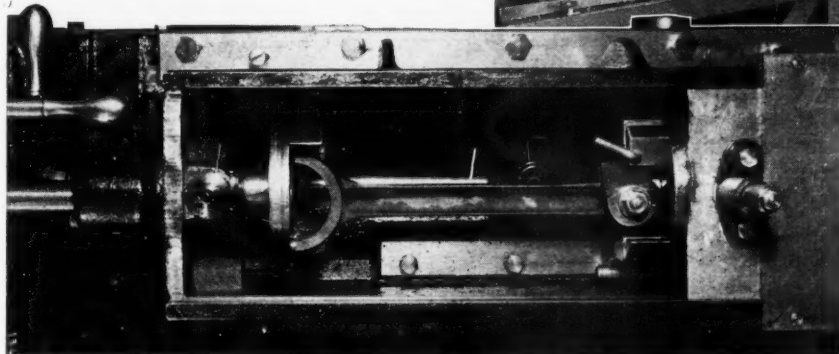
The bolt holes are drilled and rough reamed. Multiple spindle drill

The crank holes are chamfered, the rod and cap disassembled and washed, and the babbitt is then applied to both in a pressure type machine. The rods and caps are then reassembled.

Excess babbitt is removed from the sides of the crank pin boss in a drill press and the crank pin hole is semi-finish reamed to 0.001 in. tolerance in a drill press. A large chamfer is formed and the crank pin



Above—Crank pin bosses are grooved to obtain a big-end weight within a tolerance of 1/16 oz.



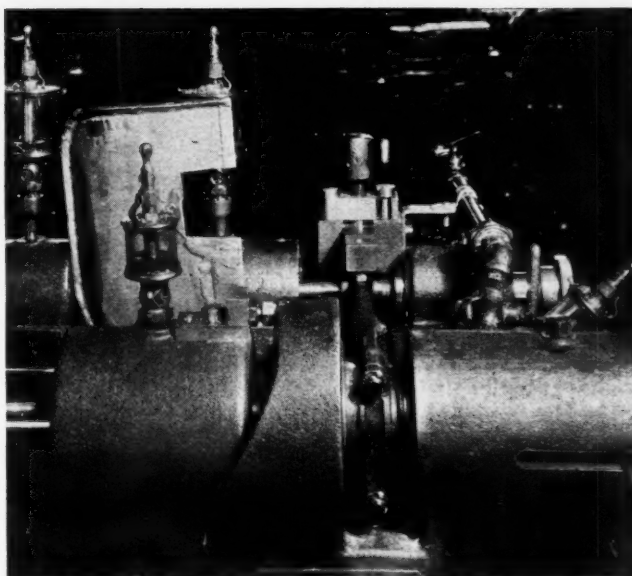
Left—Detail of spindle construction in special gun-drilling machine

presses are employed in this operation in connection with an indexing fixture which holds eight rods. The drilling is performed in two stages, each stage working on two rods simultaneously. The reaming is performed in a single operation, leaving the fourth stage for loading and unloading. The bolt holes are finish reamed in other drill presses.

The rod and cap are sawed apart in the next operation, the bolt lugs being straddle milled at the same time. Two machines are utilized for this purpose, a special rod splitting machine and a standard milling machine.

The rods and caps are then parkerized in order to keep the babbitt from adhering to any outside surfaces of the rod.

The joint faces of the rod and cap are now milled and the bolt holes are burred and chamfered. A clearance hole is drilled in the wrist pin boss for allowing the gun drill to pass through the wrist pin boss and hole. The next operation is gun drilling the oil hole. This is done on four specially designed machines, each machine having six spindles which are in a vertical position. The rods and caps are now bolted together. In a disk grinder the sides of the crank pin bosses are ground and the crank pin hole is finish bored in multiple spindle drill presses. The parkerize is removed to provide clean surfaces for tinning.



A special diamond boring machine developed by Cadillac engineers finishes both the crank pin and wrist pin holes in a single operation to tolerances of 0.00025 in. in the former and 0.00015 in. in the latter

boss is then hollow milled in special drill presses.

In four more drill presses, all of special design, the outside of the crank pin boss is chamfered.

Both sides of the crank pin boss are ground in rotary surface grinders and the wrist pin bosses are then straddle milled to length. The wrist pin hole is chamfered in a drill press.

A hand mill is next employed to mill an oil groove in the crank pin hole after which oil holes are drilled in the crank pin boss by an automatic drill press. Then follows the grooving of the crank pin boss. The rods are weighed to find how much stock must be removed and this operation is very important as the large end of the connecting rod must weigh within plus or minus one-sixteenth of an ounce. Then the rod is weighed again, this time for overall weight, and the wrist pin boss is profile milled on vertical milling machines to within a certain diameter, in which case the rod is weighed again and the wrist pin boss is grooved to give the exact weight. Following this, the wrist pin hole is finish reamed to 0.001 of an inch, parallel to the crank pin hole; to within 0.001 of an inch, indicated at a point 3 in. from the center line of the rod. Then the wrist pin bushing is pressed into place in an arbor press.

The crank pin and wrist pin holes are diamond bored in a single operation performed in a special diamond boring machine developed at the Cadillac plant.

This machine is made up of a carriage which holds one connecting rod and feeds the work to the boring bars which carry the diamond tools. The work is fed at a rate of about 0.0012 in. per revolution of the crank pin bar and about 0.0006 in. per revolution of the wrist pin bar. Speed of these bars is 1800 r.p.m. for the crank pin hole and 3600 r.p.m. for the wrist pin hole.

Tolerance in the crank pin hole diameter is plus or minus 0.00025 in., and in the wrist pin hole it is plus or minus 0.00015 in.

After diamond boring the rod is burred complete and passes to final inspection.

The center distance between the crank and wrist pin holes are held within limits 0.004 in. apart while the size of the bolt holes are permitted tolerances of 0.001 in. In assembling groups of rods for an engine assembly, weight classifications are not necessary as all the rods weigh within the limits both for "End" and "Overall" weight. The limit is one-sixteenth ounce plus or minus.

"Windmill" Airplane Tour

A BRITISH-MADE example of the autogiro (or "Windmill" airplane, as it has been termed) recently completed a month's tour of Great Britain with complete success, demonstrating the practicability of this Spanish conception for cross-country work and as a passenger machine.

The autogiro, which was described and illustrated in *Automotive Industries* of Nov. 19, 1925, just prior to which it was originally tested in England, consists, it may be recalled, of a machine which depends for its lift, not upon planes or wings of the usual type, but upon four vanes rotated initially by the engine and in normal flight by air pressure, more or less horizontally and independently of any power unit.

The recent tour started from a point near London and extended north into Scotland and back to Bristol; a score or more of aerodromes as well as private and semi-private parks, etc., were visited. The only mis-

haps were the breaking of an under-carriage wire and the bending of a rudder.

During the tour the pilot, A. H. Rawson, gave a large number of passenger flights and demonstrated the ability of the autogiro to descend with hardly any forward speed in a very small area.

The example used, which has been developed in several ways as a result of lengthy experiments in England, is fitted with an Armstrong Siddeley "Lynx" engine and has a maximum speed of 105 m.p.h. and a cruising speed of 85 m.p.h. The tour is held to have established definitely that the "windmill" plane is a practical flying machine, the full possibilities of which have yet to be realized. A European Continental tour is now under consideration.

Following the tour referred to above, the autogiro was successfully piloted across the English Channel by its inventor, Juan de la Ciega, a Spanish mining engineer. His arrival in France created somewhat of a sensation in flying circles there. In a demonstration flight over Le Bourget Flying Field several days later (Sept. 20) the plane crashed, due, de la Ciega reported, to the breaking of a cable holding in place the landing gear. The inventor, who was at the controls, and a fellow-passenger, escaped serious injury, although the machine practically was destroyed.

Alfa Romeo Wins at Boulogne

BORIS IVANOWSKI, handling a 91½ cu. in. six-cylinder supercharged Alfa Romeo car, won the sports car race for the Georges Boillot cup, at Boulogne, on Sept. 10, by covering 278.6 miles in 4 hours 34 min. 35 2/5 sec., or at an average of 69.6 m.p.h. In the race were 26 cars, of which 14 had supercharged engines. Dutilleux, in a 91½ cu. in. Bugatti made the fastest lap of the 32-mile road circuit at an average of 74.72 m.p.h. and was leading by 10 minutes, with only five miles to go, when he skidded and collapsed a wheel. Ivanowski was then lying in second place two minutes behind a 67 cu. in. Salmson driven by Rousseau but during the lap he wiped this out and won by nine seconds.

Two Alfa Romeo cars came in third and fourth; Capt. Birkin in a Bentley finished fifth; Rigal, Daray and Laly, in Aries cars occupied the next three places, and Mrs. Dykes finished ninth in an Alvis. She is the only woman ever to have finished in this race.

The Alfa Romeos, which finished first, third and fourth, were equipped with a six-cylinder engine having two overhead camshafts driven from the rear. On the front end of each shaft was a disk and between the two spring-loaded disk to absorb the backlash when running slowly. The engine had a five-bearing crankshaft, the fifth bearing being at the rear of the timing gear. The blower, which was a Rootes type, on the front of the engine, distributed the mixture through a straight ribbed intake manifold to the six cylinders.

BORIUM, made in California, is intended to be used as a substitute for diamonds in drilling. It is a manufactured product with a hardness between that of a sapphire and a diamond. Although it cannot be melted in the hottest part of the oxy-acetylene flame, other metals such as iron and steel can be brazed or fused to it. It cannot be softened by any kind of heat treatment, but can be decomposed by the prolonged heat from an electric arc. It is insoluble in any single acid, hot or cold, and can neither be machined nor ground.

Comparison Made of Hardness Tests for Non-Ferrous Metals

British study is undertaken to establish conversion curves between Rockwell, Brinell and Scleroscope numbers for copper, copper-zinc alloys and cupro-nickel.

IN a paper presented to the British Institute of Metals at its fall meeting in Liverpool, J. E. Malam discussed the Rockwell hardness test, reviewing the work of previous investigators and giving the results of his own work. The Institute of Metals occupies itself only with non-ferrous metals, and the work described by Mr. Malam was undertaken to establish conversion curves between Rockwell, Brinell and Scleroscope numbers for copper; 95:5, 70:30 and 63:37 copper-zinc alloys, and an 80:20 cupro-nickel. It was also one of the objects to make an estimate of the value of the test for the measurement of the "hardness" of non-ferrous metals and alloys.

In the experimental work specimens of the various metals were prepared in increasing degrees of hardness by cold-rolling from annealed strips. Initially all strips were 0.240 in. thick, and by the rolling the thickness was reduced successively 10, 20, 30, 40, 50 and 60 per cent. The hardnesses of the specimens were measured on a Rockwell testing machine (Model 3-B), a hydraulic Brinell machine and a Model C-1 Scleroscope. In the Rockwell machine the hammer that comes with the machine was provided with a steel ball "point."

The effect of the rolling on the "hardness" of the specimens (as measured by the different instruments) is shown in the paper by five charts of which one (Fig. 1) is reproduced herewith. While the rate of increase of Brinell hardness number with percentage reduction in rolling is in general appreciable, the rate of increase of the Rockwell number falls off considerably after the first 10 or 20 per cent reduction, so that the Rockwell test indicates only a small difference in "hardness" between material in the "half-hard" and "hard-rolled" conditions.

Straight Line Relationship

For each alloy the relation between the Rockwell number and the reciprocal of the Brinell number was found to be such that it could be represented fairly accurately by a straight line (Fig. 2). The positions of these straight lines do not differ much with the alloy and with the diameter of the ball used in the test. A straight line relationship also exists between Rockwell numbers and Scleroscope numbers.

The percentage rate of increase of Rockwell numbers is equal to that of the Brinell numbers only at certain critical points; taking Brinell numbers obtained with a 1000-kg. load and a 10-mm. ball, the critical values are found to be Rockwell (100 kg., 1/16 in.) 70 and 67, which correspond to Brinell numbers (1000 kg., 10 mm.) 118 and 62. For hardnesses above these numbers the rate of increase in hardness of the various alloys consequent upon progressive cold rolling is indicated as

less by the Rockwell ball test than by the Brinell test, and vice versa. For instance, taking two samples of 70:30 brass which have been reduced in thickness 20 and 60 per cent from the original thickness, respectively, and measuring their hardnesses with a 100 kg. pressure and a 1/8 in. ball Rockwell machine, a 100 kg., 1/16 in. Rockwell machine and a Brinell machine with 1000 kg. pressure and a 10 mm. ball, it was found that the percentage hardness increases indicated by the three methods were 10, 22.7 and 39 per cent respectively. Which of the three results is correct depends upon the definition given to "hardness." If by this property we mean "resistance to penetration" then it may be assumed that, within the range of numbers under consideration, the Brinell number gives a quantitative measure of "hardness" which is "roughly correct" in the above sense. Assuming a smooth and rigid ball, the quotient Load/Projected or flat area of impression is preferable to the Brinell quotient Load/Area of (spherical) surface of impression as a measure of the maximum pressure at which penetration is resisted. However, over the range in question the correction is small. If this

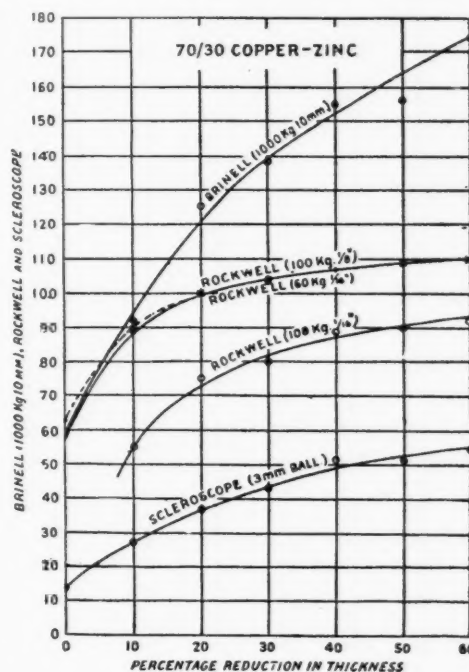


Fig. 1

be conceded, it follows that in view of the wide divergence between the Brinell and Rockwell results, the numbers obtained by the Rockwell ball test must be

considered as entirely misleading from the quantitative point of view, and this would be expected in view of the arbitrary nature of the Rockwell B scale.

No one will be inclined to under-rate the practical value of the Rockwell test, since it can be carried out

Unwin, adopted the projected area of impression as divisor, but in addition gave a tentative correction for 'adhesion' between the ball and the surface of the indentation. By these means he obtained a 'corrected contact pressure' in kg. per sq. mm., which within certain limits was found to be independent of the method of test, and which he considered represents 'a more rational value of the intensity of pressure than the usual ball and cone hardness number.' In addition, he states that 'the hardness, expressed in this way, can be regarded with greater certainty than has hitherto been the case as a definite property of the material.'

Indentation Studies

"Hankins stresses the importance of the original condition of lubrication of the indenting tool. The elastic recovery of the Brinell indentation has been studied by Heathcote, Batson, and Honda and Takahasi, the effect being that the radius of curvature of the impression measured with the load released is always greater than that of the ball. Lieber showed that the Brinell hardness numbers determined (a) under load, and (b) with the load removed, differed. In some cases the former were greater than the latter, and in other cases the reverse was true. These effects were attributed to the 'piling up' or 'sinking in' of material round the impression and relative to the original surface. The diameter of the circle of boundary of contact between the ball and the material did not, however, change appreciably on removing the load. Honda and Takahasi considered that the diameter of impression should be measured during the application of the load. In a further contribution they state that it is plain that 'in every case the Brinell number measured during loading must be taken instead of the usual number after unloading'.

"The diameters of impression under load in the plane of the original surface were deduced from measurements of depth of impression measured from the orig-

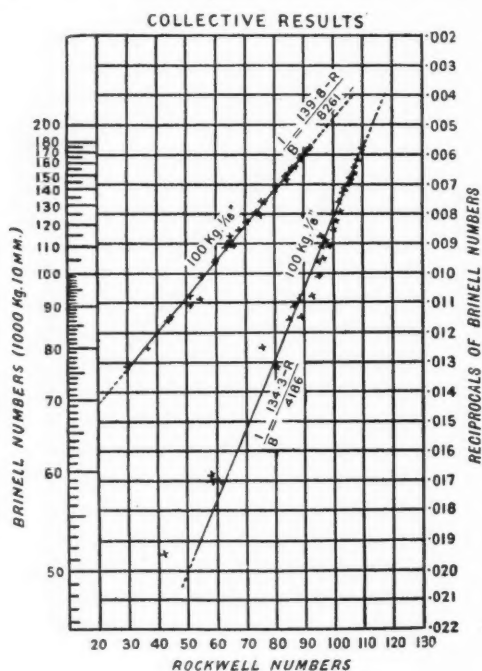


Fig. 2

in a fraction of the time required by the Brinell test and indications are that from the standpoint of reproduceability of results it is not inferior to the Brinell test. At the same time (says Mr. Malam) the increasing use of hardness numbers which are purely arbitrary and quantitatively misleading must be regarded with disquiet.

As a remedy Mr. Malam suggests that the balls be loaded proportionately in the two tests and that the Rockwell B scale be regraduated so as to give Brinell numbers directly. Strictly speaking, a slightly different graduation would be required for each different alloy, hence only an average graduation could be effected. This is probably due to the fact that the percentage decrease of the depth of indentation on release of the major load is greater than the percentage decrease of the diameter of impression.

After having suggested that both the Rockwell and the Scleroscope scales be changed, the author asks what justification there is for referring other tests to the Brinell test and whether this test itself is suitable as a standard of reference. He discusses this subject as follows:

"Defects of the Brinell test in its present form have been pointed out by several authors. Unwin considered that the Brinell number should be corrected by adopting the flat or projected area of impression as divisor, in place of the spherical area. He indicated that, by the use of a similar correction in the Ludwig cone test, the Brinell and Ludwig methods give the same hardness numbers, neglecting secondary causes of error. Unwin also pointed out that for small indentations the Brinell number is identical with the Martell number and can be defined (a) as the work required to indent unit volume or (b) the intensity of pressure at which the material yields or flows under the conditions of an indentation test. Hankins, following the suggestion of

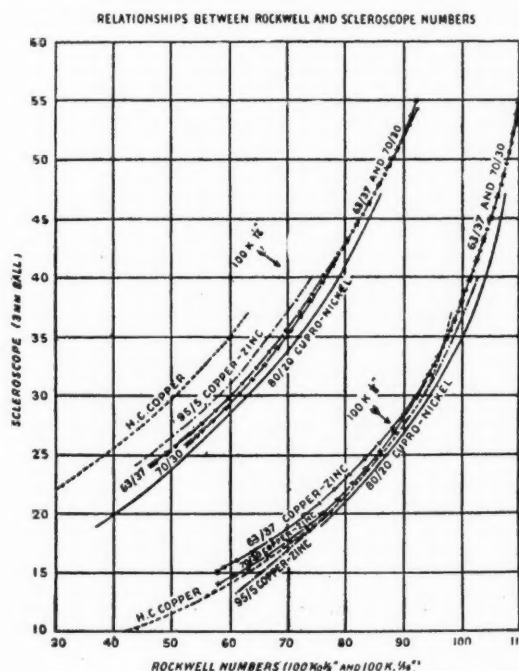


Fig. 3

inal surface level. It had, however, been pointed out by Hankins that, since the inner part of the piled-up ridge helps to support the load 'it is incorrect to neglect it,' and it would appear more rational to adopt as divisor

the area of the circle of boundary contact between ball and indentation under load, which, except perhaps in the case of very hard materials, does not change appreciably on release of load. Honda and Takahasi suggest as an amended definition of hardness 'the ratio of the applied load to the surface of impression under load.' It should be noted, however, that in the definition of Honda and Takahasi the spherical area of indentation is retained as divisor, rather than the projected area suggested by others.

"The tendency of development of the Brinell test is in the direction of identifying the number obtained with a definite physical property of the material. The principal conditions necessary for the approximate realization of this ideal are:

- "(1) The limitation of the depth of impression;
- "(2) the adoption of the projected area of impression under load as divisor; and
- "(3) the reduction of the friction between the ball and the material tested, to a minimum. In addition, the correction for such friction as is unavoidable.

"The more closely these conditions are realized, the more closely should the resultant number represent the maximum pressure at which penetration of the material is resisted. Even under present conditions it is probable that, since

- "(1) the depth of indentation is in general small compared with the radius of the ball,

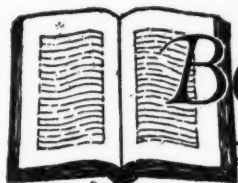
- "(2) the division by the projected area involves only small corrections in the case of hardness numbers not less than 50,

- "(3) the change of diameter of impression on release of load is small, and

- "(4) polished and well-lubricated balls are used, the Brinell numbers obtained do not differ very widely from the theoretical values of the indentation pressure in kg. per sq. mm., or alternatively in accordance with the suggestion of Unwin, from the work required to indent unit volume.

"From the above points of view it is to be hoped that, on the adoption of refinements which may ultimately be agreed upon, the Brinell test may be considered as suitable for a standard to which other tests may be referred, the number obtained having a physical significance capable of exact definition.

"It is perhaps not too much to say that the present state of complexity at which the theory of hardness testing has arrived, the increasing use of methods of testing which yield results having no rational quantitative significance, and even the building up of technical literature around such results, are matters which must be regarded with disquiet, and it appears worthy of consideration as to whether a standing committee might not be set up consisting of representatives of the various scientific societies interested, and whose duty it would be to consider the whole question of hardness testing."



Books for the Business Bookshelf

Elements of Aviation

Virginius Evans Clark. The Ronald Press Co., New York. 193 pp. illus. \$3.

COL. CLARK has written this volume of the Ronald Aeronautic Library for the purpose of explaining to students, airplane pilots, mechanics and other interested men and women, the fundamental principles of flight and the elementary design considerations involved in aircraft construction. The book is decidedly non-technical and can be thoroughly understood by anyone with very abbreviated mathematical knowledge yet the experience and training of the author guarantees the accuracy of what he writes. Altogether it is a very welcome addition to the growing number of publications which must assume a considerable share of the burden of making the American public air conscious.

German Buses and Trucks

Published by Verlag Deutsche Motor-Zeitschrift, Mueller-Ber-set-Str. 17, Dresden-A19, Germany. illus. Price, 2 marks.

THIS publication, the full name of which is "German Buses, Trucks and Tractors," gives the specifications of German buses, trucks and other utility vehicles, small carriers, tractors and engines, among the latter a six-cylinder Diesel for automotive work made by Koerting. Full particulars of each item are given, one page being devoted to each. The Diesel tractor of Motorenwerke Mannheim is also included.

How to Influence Men

Edgar J. Swift. Charles Scribner's Sons, New York. 407 pp. \$3.

THIS is a revised and enlarged edition of Mr. Swift's well-known book, *Business Power Through Psychology*, so that all who have read that will know

what to expect in the present volume. The task of influencing others is of first importance in selling, so this, naturally, has received the major attention. The problems presented in personnel work and in managing others have also been considered. Extensive use of anecdotes and case material serves to add interest to the treatment which, in general, is logical and sensible and as practical as the nature of the subject permits.

How to Solve Typical Business Problems

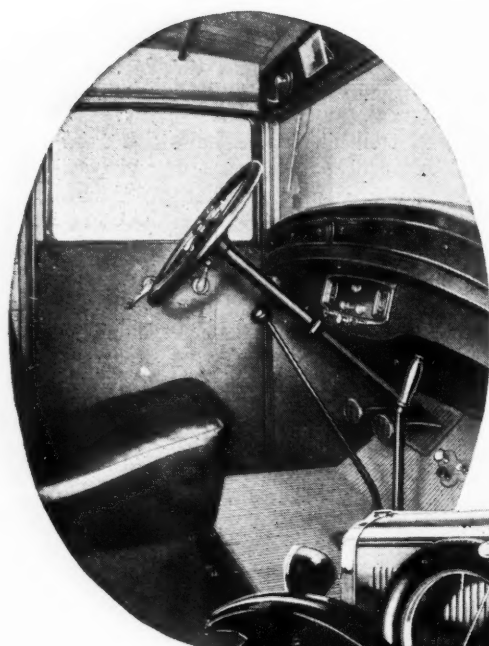
William R. Basset. The B. C. Forbes Publishing Co., New York. 223 pp. \$2.50.

IN the main, the contents of this book consist of reprints of magazine articles which have appeared during the past year or two in various publications all of them illustrating Mr. Basset's business philosophy which, on the whole, is modern and progressive and well worth consideration. The work is full of incidents from practice used to illustrate the points made which make the book rather interesting reading. Mr. Basset's liberal views on labor relations, in particular, are thoroughly modern.

Patent Law

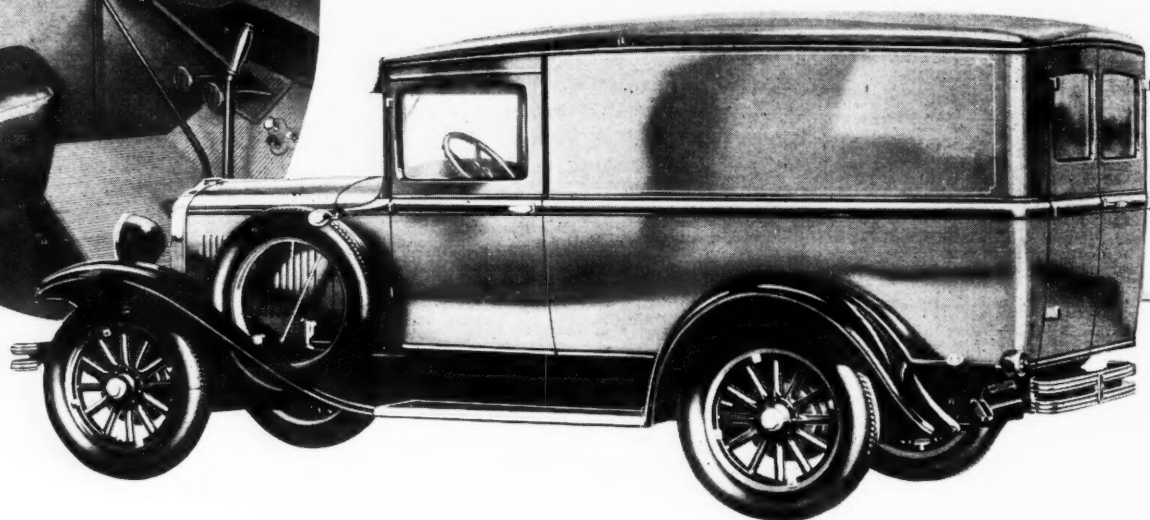
By H. A. Toulmin, Jr. Harper & Bros., New York. 288 pp. \$4.

AT one time patent laws and their applications were a veritable labyrinth to the average business executive, but during recent years a number of volumes similar to the present one have been published, each of which purposes to make clear the fundamentals, at least, of patents and their legal status. Mr. Toulmin is an accomplished writer and has had a great deal of experience as a patent lawyer. The combination makes the book both interesting and valuable.



Left—View of the front compartment of the new Chrysler-built Fargo "Packet" panel body delivery truck which is mounted on a four-cylinder chassis similar to that of the Plymouth passenger car

Below—Exterior view of the Fargo panel body "Packet" delivery. List price of this model is \$795



New Fargo Truck Line is Developed from Chrysler Passenger Cars

Four-cylinder Plymouth engine used in 1/2-ton "Packet" model, while 3/4-ton "Clipper" is fitted with six-cylinder "65" powerplant. Bodies of attractive design.

AS announced in the news section of *Automotive Industries* last week, the initial offerings of the Fargo Motor Corp., newly formed truck division of the Chrysler Corp., will consist of two delivery models of 1/2-ton and 3/4-ton capacities. The smaller job, designated as the "Packet," is powered with a four-cylinder engine, while the 3/4-ton "Clipper" model has a six-cylinder engine.

The Fargo sales organization will consist of direct dealers and sub-dealers recruited from both the passenger car and truck fields. In some cases sales will be handled by Chrysler dealers, in some by De Soto organizations, and in some localities by separate dealers for the trucks alone.

Following are the prices of the two delivery lines thus far announced:

	"Packet" 4-cyl. 1/2-ton	"Clipper" 6-cyl. 3/4-ton
Chassis	\$545	\$725
Panel body	795	975
Glass side body	895	1,075

Both models are designed to deliver passenger car comfort and passenger car performance. For that

reason the major units are derived from the various Chrysler passenger car lines, with the necessary modifications to adapt them to commercial use. This policy also makes the question of servicing simpler, reduces the stock of parts to be carried and makes them more easily available, besides being a large contributing factor toward enabling the Chrysler Corp. to market the jobs at low prices.

As far as appearance is concerned, passenger car lines of the most modern accepted standards of beauty are characteristic throughout. Belt-moldings, passenger-car type radiator shells, color schemes, general body streamlining, rounded rear body corners, fenders—all contribute to that end.

The 1/2-ton "Packet" bodies have slat roofs; metal-stripped wood flooring; cotton padding in roof and between slatting and body panels to kill rumble and squeaks; body panels bolted to the floor, replacing the usual wheel housings; dome light in the rear compartment; rear doors with windows, of the flush type; double-action door locks, holding doors both top and bottom; VV windshields; remote door controls; decorative instrument panels; bucket-type driver's seat; draft plates around hand controls and foot pedals,

and felt-lined rubber mat in front compartment.

Sedan and delivery panel body styles are available. Additional single seats and full width cross seats are available for the sedan at extra cost for "station wagon" use.

The chassis is of clean design with easy accessibility of parts for servicing. Internal Lockheed four-wheel brakes with self-compensating, self-refilling master cylinder are fitted. The single dry plate clutch has the same dimensions as that used in the Plymouth passenger car, and the three-speed transmission is also from the Plymouth chassis. The rear axle is the same as used in the De Soto, with 4.7 to 1 reduction. Steering gear is of the worm and sector type. 29 by 4.75 tires. Springs have rebound control leaves. The engine is mounted in vulcanized rubber. Frame is 5 in. deep with 1 3/4-in flange and has four cross-members. Tires are 29 by 4.75.

The engine is based on the Chrysler Plymouth and has such features as force feed lubrication to camshaft as well as crankshaft and crank pin bearings; aluminum alloy pistons; molded rubber mountings, three-point; crankcase ventilation; semi-automatic ignition; unit transmission, and air cleaner on carburetor adjustable for idling only.

Equipment includes dome light, mirror, automatic windshield wiper and spare tire mounted in front fender well.

The 3/4-ton Clipper bodies are the same as on the 1/2-ton, being interchangeable. Following are major interior dimensions:

Inside length, driver's seat to rear door, 72 3/4 in.

Inside length, front of driver's seat, back, 88 3/4 in.

Inside width at belt line, 49 in.

Inside height of body from floor line to roof, 47 1/4 in.

The chassis is developed from the Chrysler "65." In addition to chassis features on the 1/2-ton, the 3/4-ton has Lovejoy hydraulic shock absorbers, rubber shackles, and a 100-amp.-hr. battery. Frame is 6 in. deep with 2 1/2 in. flanges, and has five cross-members. Tires are 5.50/18 on artillery wood wheels.

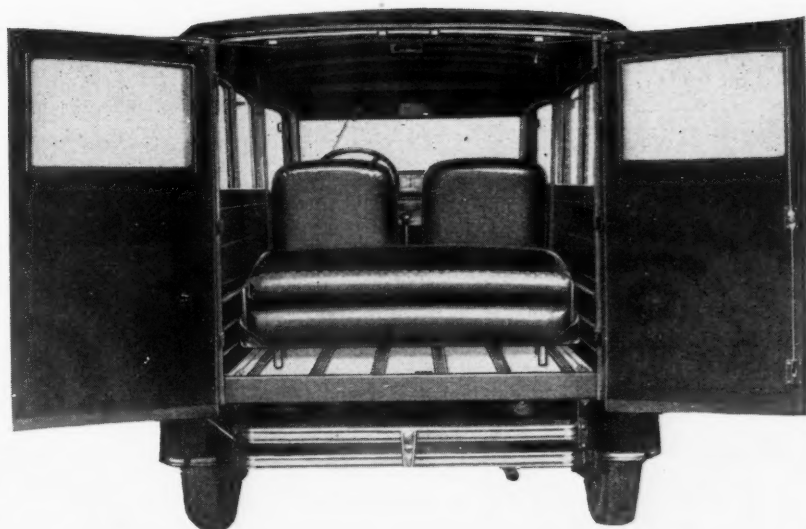
The engine, also developed from the Chrysler "65," has invar strut pistons; seven-bearing counterweighted crankshafts; full pressure lubrication; oil and air cleaner; rubber engine mount; crankcase ventilation; impulse neutralizer and semi-automatic ignition.

Geometrical Motion Analysis

(Continued from page 445)

rotation and for an intake valve if it has push rotation.

A desirable feature with both rotations is the fact that the acceleration reaches its maximum value at the end of the accelerating period, instead of at the beginning and end of the period of valve lift. Having a maximum acceleration occur at an intermediate point, will reduce the accelerations at the beginning and end of the lift, at which latter points a high rate of acceleration means noisy operation. At the same time the maxi-



Rear view of the glass side Fargo body, showing the roominess of the interior and optional types of seats available

mum acceleration must be kept within bounds. The same remark applies to the maximum deceleration, the more so because it occurs at a time when the pressure of the spring has not yet been materially augmented by the valve lift. Altogether this valve lift has much to recommend it, and the general experience with it seems to be favorable.

Returning once more to Fig. 2, we notice that the surface that engages the vertical valve stem is curved and has a radius R_1 . During the upstroke of the valve the axis of R_1 moves slightly to the right, in consequence of which the distance from a vertical through the contact point to the fulcrum O_2 changes from L_1 to L_2 . In a well-designed valve drive the difference between the two valves would in no case be great, and in concluding our calculations we will use a value L midway between L_1 and L_2 .

Let it be desired to determine the valve speed V in ft. p. s. and the valve acceleration A in ft. p. s.², for a certain position of the mechanism, let us say the beginning of the end acceleration, for a camshaft speed $N = 1,000$ r.p.m. The camshaft speed in radians per second,

$$\omega_1 = 2 N/60 = 104.7$$

and $\omega_1^2 = 11,000$. From Fig. 10 we find that for this position of the mechanism

$u = -20$ per cent $= -0.2'u' = 52$ per cent $= 0.52$
For a length $L = 2.4$ in. ($= 0.2$ ft.), we have for the valve speed

$V = \omega_1 L u = 104.7 \times 0.2 \times 0.2 = 4.2$ ft. p. s.
and for the valve acceleration

$$A = \omega_1^2 L u' = 11,000 \times 0.2 \times 0.52 = 1140 \text{ ft./sec.}^2$$

A WRITER in a German paper maintains that the fuel tank filler opening should be at the left side, because when stopping in front of a fuel pump the right wheel generally is lower than the left one and it is impossible to completely fill the tank, while in addition, on strongly crowned roads, fuel will be lost through the filler if it is located on the right-hand side. Fillers on American cars are generally located on the right-hand side, evidently because they are there more convenient when filling. But the argument advanced in favor of fillers on the left seems logical.

NEW DEVELOPMENTS—Automotive

Brake Drum Grinder

A NEW brake drum grinder has been developed by Cincinnati Grinders, Inc., Cincinnati, suitable for grinding drums used on light cars, or up to internal diameters of 12 in.

The new machine is built much like the company's centerless grinder with a 2700-lb. cored box-type bed casting and the wheelhead an integral part of the body.

The chrome-nickel steel, forged grinding wheel spindle is mounted in bronze bearings and is driven by flexible chain. Automatic pressure feed lubrication is provided for the bearings.

Air operation has been provided to eliminate hard manual operation wherever possible, the entire workhead being pivoted on the infeed slide and moved to and from the grinding position by means of air. The drums are clamped to the face plate by an air chuck.

The workhead is counterbalanced and all sliding surfaces are lubricated by the Alemite system. The 2-hp. constant speed, d.c. workhead motor is mounted on the swivel head and is direct-connected through a flexible coupling to a heat-treated steel worm gear and bronze worm wheel which rotates the air chuck spindle.

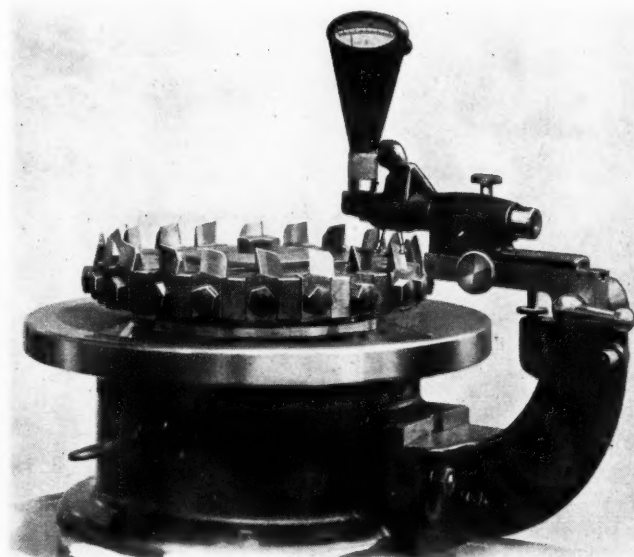
Drums are located from the bore of the hub, or in the case of the Ford, from the Timken bearing surfaces. The workhead motor is automatically started and stopped by means of a switch mounted in the swivel head. After the work is brought in contact with the grinding wheel a downward movement of the infeed lever feeds the drum into the wheel to remove 0.015 to 0.020 in. of stock to finished size in a single operation.

Compensation for wheel wear is furnished in a hand infeed screw and micrometer adjustment while a wheel dresser is permanently mounted on the head over the wheel. A separate coolant system supplies coolant for dressing while an impeller-type pump supplies grinding coolant.

Power is supplied to the grinding wheel spindle, coolant and oil pumps by a 20 hp. motor fastened to

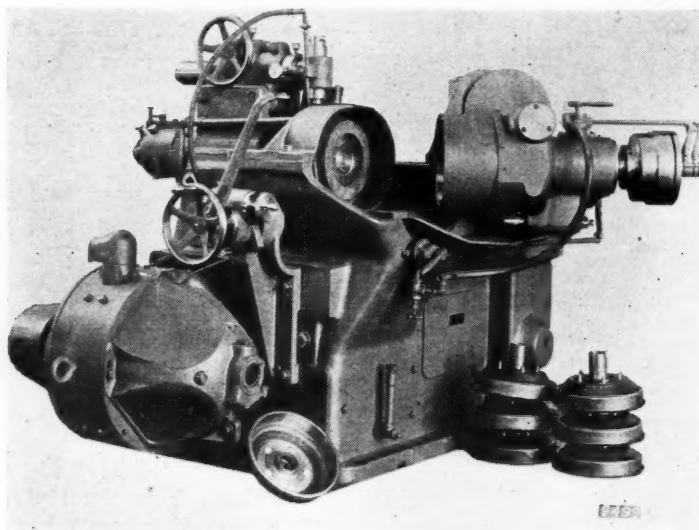
the bed of the machine. A silent chain drive is used to the main shaft. Machines now in production have a production of about 60 drums per hour, floor-to-floor time, with but one operator per machine. Due to the wheel used and the general design and rigidity of the machine the finish given is somewhat better than the standard good commercial finish required for this work.

Spiral Cutter Truing Fixture

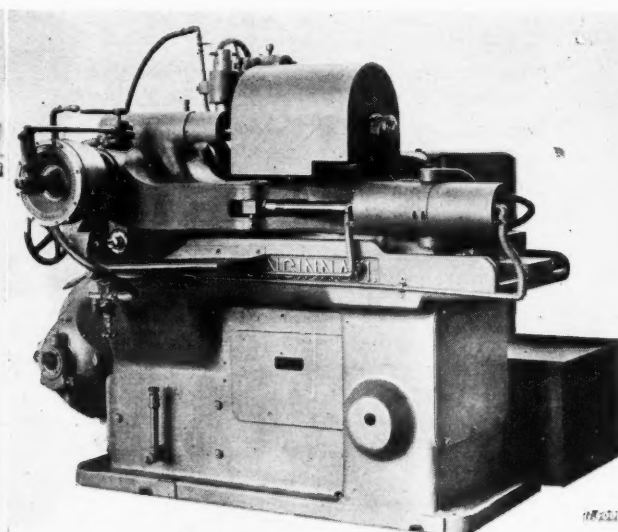


New Gleason fixture for truing spiral bevel gear cutters

THE GLEASON WORKS, Rochester, N. Y., have developed a spiral cutter truing fixture for truing up the circular cutters used in Gleason spiral bevel gear generators. Use of this device not only releases cutting machines for productive work but the truing job is done



Operating side of new Cincinnati brake drum grinder with workhead in loading position



In grinding position. An air cylinder actuates the workhead and moves it to and from the grinding wheel

Parts, Accessories and Production Tools

more accurately and conveniently. After cutters are trued on this fixture they may be placed in the machine and used without further checking, provided the generating machine cutter spindle runs true.

The fixture consists of a spindle designed to accommodate the various sizes of spiral bevel gear cutters. A large hand wheel attached directly to the spindle is used to turn the cutter to the desired point for checking, when the spindle is locked in position by a lever.

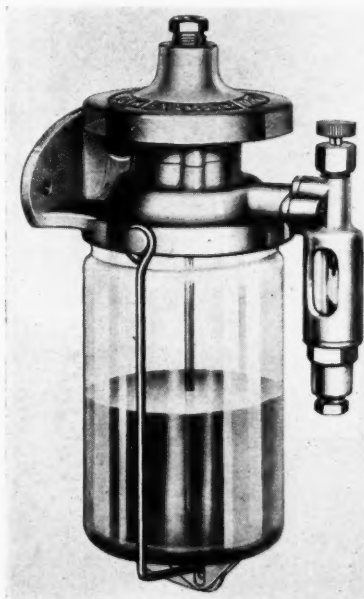
Great care has been used in selecting the precision ball bearings on which the spindle is mounted and the spindle is ground in its own bearings so that run-out is reduced to within 0.00005 in. Several different measuring devices may be used in connection with the fixture, all of them reading to 0.0001 in. By the use of a finger device and a system of levers one indicator is used for checking both the inside and outside cutting blades.

The fixture is mounted on a very rigid base which is adjustable for height.

Top Cylinder Lubricator

A NEW top cylinder lubricator which supplies oil to the valves and tops of the pistons at a rate proportionate to the speed of the engine has been developed by the Lubricating Equipment Co., 624 S. Michigan Ave., Chicago.

The device consists essentially of a diaphragm pump, actuated by pressure of exhaust



Lubricating Equipment Co.'s top cylinder oiling device

gases and supplied by a glass oil reservoir and a needle valve flow control. The diaphragms lie in horizontal position with spaces above, below and between. The upper space is connected by pipe to the section of the exhaust manifold most remote from the outlet. The lower space opens into a needle valve control chamber and thence to the intake manifold at the spread by pipe. When an exhaust valve opens, the pressure in the manifold is transmitted to the top diaphragm.

When the pressure forces the top diaphragm downward, the lower diaphragm is actuated, thus forcing a stream of oil from the lower chamber through the needle valve.

When the exhaust valve closes, the pressure drops, the diaphragms return to normal position and the suction thus engendered draws oil from the reservoir below the pump into the lower chamber.

A porous felt plug is fitted into the pipe leading to the intake manifold, just below the needle valve outlet. On the intake stroke, the oil with which this plug is saturated is forced by suction into the intake manifold in the form of a mist. The oil is thus forced into the cylinders at each intake stroke of the pistons.

From this it will be seen that the rate of lubricant delivery is dependable not only on the speed, but is controlled also by the needle valve. When the needle is almost closed, the back pressure on the lower diaphragm is so great as to force only short strokes by the pump. As the needle is opened wider the resistance decreases and more oil is delivered to the porous plug.

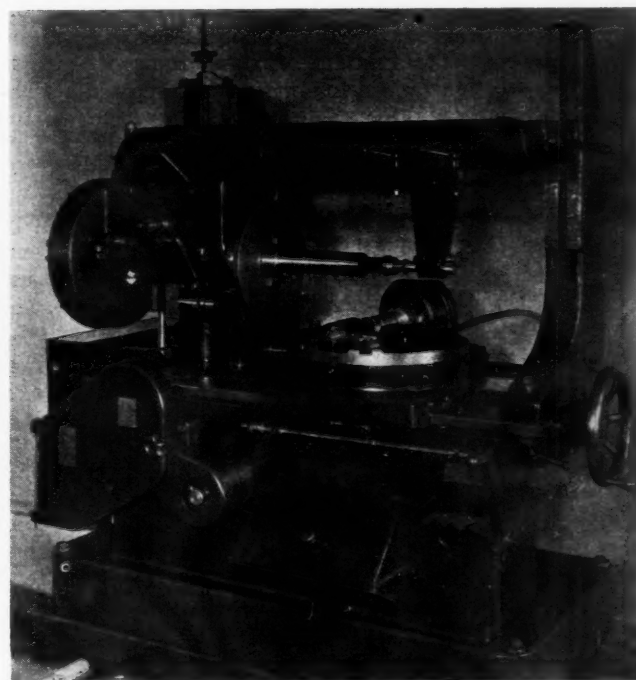
Newark Hobbing Machine

A NEW hobbing machine designated as No. 3 has been added to the "Spirit of Production" line of gear cutting machinery made by the Newark Gear Cutting Machine Co., Newark, N. J. This machine has a capacity for gears up to 18 in. diameter and is made in plain and universal types.

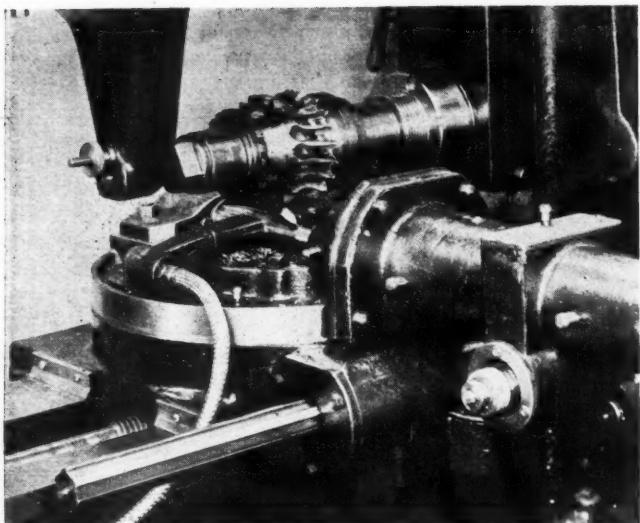
The universal type, designed for holding helical and herringbone gears, has a differential mechanism which permits separate control of lead, feed and indexing trains of gearing so that any feed may be used without losing the helical path or recalculation of gear train ratios.

The plain type machine is designed for hobbing spur gears, spline shafts and worm wheels. The horizontal cutting principle is used on these machines and the work spindle is bored to a diameter of 2½ in. to permit working on long shafts or gears solid with shafts.

Cutting power is received from a splined side shaft, through a hardened and thread-ground worm mounted



Newark No. 3 "Spirit of Production" hobbing machine



Tangential attachment for generating worm wheels

in Timken bearings and is transmitted to a combined worm wheel and bevel gear ring and then to a bevel gear mounted directly on the hob spindle.

Rapid traverse is provided for the cutter carriage in both directions. Automatic lubrication is supplied. Speed change gears are driven by square shafts, the lead, feed and indexing gears by double key shafts. The master worm wheel is accurately generated in its own bearings.

The overarm ties both ends of the machine and provides a rigid support for the work arbor through a sliding arm. Extra equipment available includes a tangential attachment for generating worm wheels with taper hobs, star cutters or fly cutters and a long spline shaft attachment for automatically hobbing multiple spline shafts of great length.

Borst Spring Shackles

THE Borst spring shackles recently developed by Pau Jun Engineering Co., 795 Washington St., Buffalo, N. Y., has been designed to provide silent operation with a maximum of riding comfort and to eliminate side sway, spring whip and side slap. The bolts are securely locked in the frame and spring eye by pinch bolts so that they cannot move. This provides a leverage which is said to control side sway.

Shackle bound springs are said to be impossible with these shackles and spring whip is eliminated by means of four spools located at each spring end. These spools are self-lubricated and are applied under pressure to provide automatic wear take-up.

Wahl Shock Absorber

THE WAHL CO., 1800 Roscoe St., Chicago, Ill., has brought out two new automotive accessories, a hydraulic shock absorber and a car heater. The new shock absorber controls both deflection and recoil and a new "cold test" fluid is used which is said to permit the device to function efficiently at all temperatures.

The shock absorber is easily adjustable to any car and the Wahl tie rod and live rubber universal joint are both used. The cylinder unit may be mounted parallel to the frame with the arm at the proper an-

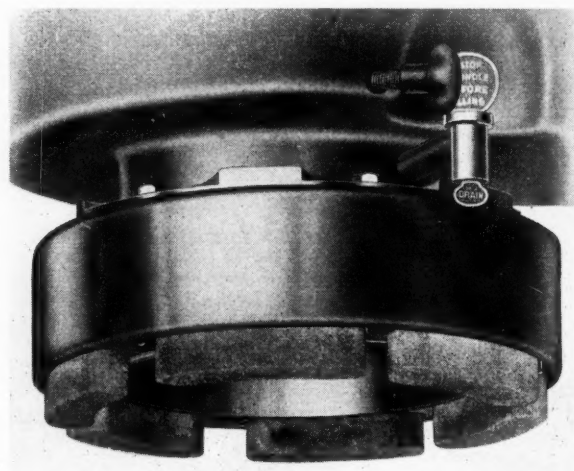
gle to obtain a neutral position of the piston.

The new car heater picks up fresh air by means of a funnel located back of the fan and carries it through a radiating unit about the exhaust pipe where it is heated and thence to the register in the body. This serves to change the air in a car every three or four minutes, it is said.

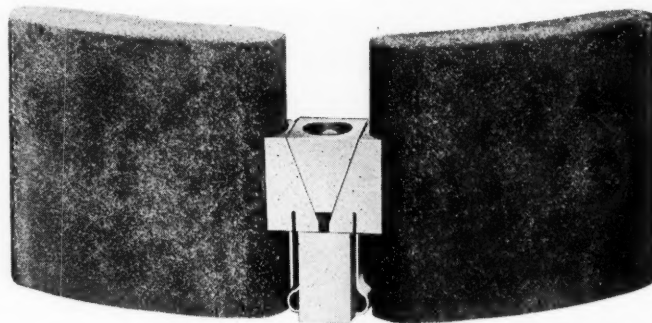
Installation is easy since the exhaust pipe does not have to be cut, while an effective damper in the funnel permits the heat to be regulated to any desired degree in the winter or to be shut off entirely during the summer.

Segment Grinding Wheel

A NEW segment grinding wheel, designed for use on its No. 16 surface grinding machine, has been developed by the Blanchard Machine Co., Cambridge, Mass. The new wheel consists of a chuck with six abrasive elements securely fastened in position by clamping devices. The chuck body is machined from a steel forging and is rust-proof. The three fixed abutments and the clamping units are of aluminum bronze,



The new Blanchard 18-in. segment grinding wheel



Detail of the clamping device used on the Blanchard segment wheel

except the screws of the latter, which are made of stainless steel.

The abrasive segments are made with rounded ends to match the radius in the fixed abutments and in the self-aligning shoes of the clamping devices. The abrasive segments are 6 in. deep when new and over 5 in. can be used.

Just Among Ourselves

A Production Record That Wasn't Expected

THIS automotive industry of ours just won't settle down to a humdrum existence and get itself in line with the curves and prognostications of the statistical experts. Who in the world ever would have predicted twelve months ago that the industry would turn out its largest single month's production in August, 1928? Probably some figure juggler will say to himself, "Well, I would have," as he reads this. For our own part, however, we are frank to admit that we would have cried him to ridicule if we had heard him making the prediction. And we believe that a majority of the executives of the industry would have done so at the same time. Now there seems to be some possibility that an even higher record for total units built will be found to have been run up in September. And the best part of it all is that there isn't the slightest indication of overstocking of dealers on any general scale, while the used car situation seems to be continuing about as bad but not a bit worse than it has been for a number of years back. Seems as though wonders never will cease so long as the automotive industry is on the job to create new ones.

* * *

Parts and Accessory Business Booming

THE parts and accessory business has a brighter outlook right now than for some time past. Not only do net profit figures for the first three quarters indicate a better condition than last year, but the orders coming to a number of independent makers from car companies which previously have been

making all of their own requirements cast an optimistic light on the immediate future as well. While it is perfectly true that some of the car builders who are going outside for their requirement now may drop off those outside sources should business decrease, nevertheless it begins to look as though there would always be some fair proportion of car and truck makers at any given time doing so well as to need active help from the parts makers. Business has tended to swing from one quarter to another among vehicle companies in the last few years, but the one on top of the heap always needs outside sources. In some ways that may permit the independent parts maker with flexible facilities to have as steady a production as any given car.

* * *

Optimism Still There, But It's Toned Down

THE automobile business has been criticized for exaggerations on many occasions. Our advertising, we are told, is too full of superlatives; our sales estimates usually shoot far above the mark; our factory executives are always overly-optimistic in their statements to the public and to dealers about the prospects and outlook for their particular companies. Maybe that's so; certainly we have laid ourselves open to those criticisms. But, just as in the attitude toward labor relations, we seem to sense the growth of a conservative, but none the less intense, optimism in the place of the "whoopee" approach to merchandising problems which once prevailed in some quarters. Typical of the new attitude which seems to see in current successes

merely the development of a sound foundation on which hard work and intelligent planning may build a successful future, is a brief statement by Du Bois Young made in the Hupmobile dealer house organ following the announcement of the 1929 Hupp line. Referring to the many letters of praise which had come in, Mr. Young says: "Do we discount any of this extravagant praise? Of course we do. We know that good feeling—prosperity—contentment—encourage exaggeration. But just the same we know that good words do not—cannot—spring from bad feelings. Hence we are pleased and we have every right to be. . . . In the meantime we are carrying on—working and planning—just as though nothing had happened."

* * *

Art Expressed in Automobiles

THE interrelation of modern art and modern industry becomes more apparent every year. Not only has industry, particularly in the automotive field, come to feel the very definite need of artistic technique in working out its practical creations; artists themselves, as well, are coming to see in modern industry a means for expressing the spirit and psychology of our day and age. One prominent art critic is quoted as stating recently that "the dominant art of the future would seem to be foreshadowed, not in easel paintings, but in automobiles and set-back apartment houses." Thus, it is not too much to believe, art may find in industry new avenues of expression, just as industry is finding in art new ways to improve its products.—N.G.S.

News of the Industry

PAGE 460.

VOLUME 59

Philadelphia, Saturday, September 29, 1928

NUMBER 13

September Output Total Near August High Mark

PHILADELPHIA, Sept. 28—Operations approximating capacity will be carried through to the end of the month in practically all leading automobile and truck factories and will bring the total for the month well in advance of the 400,000 mark. Indications at the present time are that the month will compare favorably with the 485,000 total set up in August, though a minor falling off is certain, due to fewer working days and the interference of the Labor Day closing.

Entering the last quarter some decline in operations will occur from the high third-quarter totals, but all signs point to the establishment of new fourth-quarter records. Dealers are far from having caught up with orders in many instances and stocks of new cars about the country are lower for the season than in recent years. Seasonal declines in sales must be anticipated but there is every indication that these will be gradual. Factory operations, accordingly, will be only tapered off except in instances where manufacturing changes are to be made.

Though sales of Ford Motor Co. of Canada have reached a point where dealers are now able to make deliveries within only a few days' delay, the Ford dealers of the United States are still weeks behind in deliveries and the factory will continue on increasing schedule for at least the remaining months of the year.

Morris and Austin Plan 160,000 Output in 1929

NEW YORK, Sept. 24—Increased production schedules for 1929 are announced by two of the largest British manufacturers in advance of the opening of the Olympia Show in October. Morris Motors, Ltd., reports contracts with dealers for the coming year totaling \$100,000,000 and calling for 100,000 cars. Austin Motor Co. contracts call for 60,000 cars valued at \$75,000,000. The Hillman Motor Co. reports contracts for \$15,000,000 in cars.

Hupp Shipments 57,423

DETROIT, Sept. 26—Hupp Motor Car Corp. will ship approximately 19,000 cars in the third quarter as against 7596 in the same period last year. Nine months shipments will total about 57,423 as against 29,906 in 1927.

Avery Succeeds Wilson as President of Murray

NEW YORK, Sept. 26—The Murray Corp. of America, at its annual meeting held in New York today, elected new officials and eight new directors. Among the new officers is C. W. Avery, former assistant to the president, who becomes president, succeeding William R. Wilson, whose resignation was accepted at this meeting. H. O. Barker becomes chairman of the board; A. P. Dowell becomes vice-president in charge of manufacturing, and C. H. Widman becomes vice-president in charge of sales.

Newly elected directors include C. W. Avery, A. P. Dowell, C. H. Widman, H. O. Barker, S. P. Curtis, D. W. Gurnett, J. C. Marckley and C. C. Gibson. These together with C. Higbie, E. A. Potter and K. L. Ames constitute the present board of directors.

Crawford Heads Reliance

MASSILON, OHIO, Sept. 25—Reliance Mfg. Co. has been reorganized with W. H. Crawford as president and H. J. McGinn as vice-president and general manager. Mr. Crawford formerly was secretary and treasurer, and Mr. McGinn was formerly general sales manager. Their elections followed the retirement of F. C. McLain as president, and E. W. Hart as vice-president.

Horton Succeeds Ashton

CHICAGO, Sept. 26—E. J. Ashton has resigned as zone manager of the central territory of Greater Market Development of the Automotive Equipment Association and has been succeeded by H. M. Horton, formerly sales promotion manager at the Marmon Motor Car Co., Chicago office.

British Price Cuts Lower "Six" Levels

WASHINGTON, Sept. 27—A move on the part of British automobile manufacturers to get a larger share of six-cylinder car market is seen by the Department of Commerce to be reflected in recent price reductions in London, other British producers following the example of Austin in making certain cuts, according to advices received from the London offices of the department. Manufacturers making reductions in virtually all lines include Morris, Wolseley, Rover, Armstrong-Siddeley, and Austin. The reports from London indicate, however, that the price cuts are not yet sufficiently low to encroach on the sale of the most popular American cars in this class.

Ford Shipping Interests Under U. S. Investigation

WASHINGTON, Sept. 25—An investigation of the status of vessels operated between the Atlantic and Pacific coasts through the Panama Canal by the Ford shipping interests was instituted by the U. S. Shipping Board today. Ordering the inquiry the board adopted a resolution setting forth the failure of Ford Motor Co. to file with the board maximum rates as required by the Shipping Act.

Ford to Make Shock Absorbers

DETROIT, Sept. 24—Ford Motor Co. will begin manufacture of shock absorbers under Houde patents at its Green Island plant near Troy, N. Y. The new department will use 40,000 sq. ft. of plant space formerly used for the sales and service department. Initial production of shock absorbers will approximate 1500 sets daily.

Clayton & Lambert Build

DETROIT, Sept. 25—Ground was broken yesterday for a new office building and industrial plant for the Clayton & Lambert Co. to cost more than \$1,000,000.

M. & A.M.A. Approves A.E.A. Consolidation

Action by Members Makes
Merger of Two Bodies
Effective at Once

NEW YORK, Sept. 26—Ratification of the merger of the Motor & Accessory Manufacturers Association and the Automotive Equipment Association was voted unanimously at a special meeting of the former organization held yesterday afternoon at Hotel Astor in this city. Inasmuch as A.E.A. members had previously approved the plan, the new organization formally entered its existence and the two older organizations automatically passed out of existence with this vote. The new organization has more than 800 members, producing virtually all automobile products except complete vehicles, and wholesalers and will be known as the Motor & Equipment Association.

The consolidation fuses the strength and combines the activities of the 24-year old Motor & Accessory Manufacturers Association, comprised exclusively of manufacturers, and the Automotive Equipment Association, which was formed 13 years ago and whose members include automotive equipment wholesalers and manufacturers of products which the former distribute.

Ratification of the merger by the M. & A.M.A. marked the culmination of negotiations begun last May, when a special committee of the association and the executive committee of the A.E.A. held their first conversations on the subject. The A.E.A. membership voted in favor of the merger at the summer convention at Mackinac Island in June, giving the executive committee power to proceed. On the M. & A.M.A. side of the merger affairs were handled by the board of directors and the special committee, with action of the membership as the final step in the proceedings.

A special committee of the M. & A.M.A. to work with the A.E.A. in the organization of the new association is comprised of J. M. McComb, president; W. T. Morris and C. H. Burr.

Heminway Managing Director

M. L. Heminway, general manager of the M. & A.M.A. for approximately 10 years, will be managing director of the new association. B. W. Ruark, commissioner of the A.E.A., will be assistant managing director.

The new association will continue features of the Greater Market Development work of the A.E.A. and the sales development work of the M. & A.M.A. adaptable to the merged organization. This work will include the annual wholesale trade show of the A.E.A. and participation in the national automobile shows at New York and Chicago.

The credit service of the M. & A.M.A.,

traffic service of the A.E.A., participation in the Motor Vehicle Conference Committee, of which the M. & A.M.A. was one of the founders, cooperation with other associations in the automotive industry and other industries and legislative work, will also be continued. New activities will be developed from time to time to provide the greatest possible service for manufacturer and wholesaler members and to promote the interests of the industry and the public.

The M. & A.M.A. was organized in 1904 with 37 charter members. Membership, which has grown to approximately 400, comprises virtually all manufacturing divisions of the industry except makers of complete motor vehicles. The A.E.A. was organized in 1915 as the National Association of Automobile Accessory Jobbers. Fourteen wholesalers were charter members and manufacturers were not included until a year later, when they were admitted into associate membership. Later associate memberships were abolished and manufacturers put on an equal basis with the wholesalers. The A.E.A. has grown to more than 500 members, approximately 300 of whom are wholesalers, and the remainder manufacturers of accessories, service parts, shop equipment and kindred products.

H. H. Kelly Resigns to Join Manufacturer

WASHINGTON, Sept. 25—The resignation of H. H. Kelly as American automotive trade commissioner for Europe was tendered today to the Department of Commerce to become effective Nov. 1. The resignation has been tendered, it is understood, following the acceptance by Mr. Kelly of the position of European representative of a large American automobile manufacturer whose identity will be announced later. A successor to Mr. Kelly will be named later by the department.

Mr. Kelly first served in Europe as an assistant trade commissioner under appointment by the department and last year was made automotive trade commissioner for Europe, having jurisdiction over practically all of the continent. He has been an outstanding force in the development of American automotive markets and is president of the American Automotive Club of Europe.

Moon Offers \$1,395 Sedan

ST. LOUIS, Sept. 24—Moon Motor Car Co. has introduced a new low priced special Aerotype 6-72 sedan at \$1,395. Equipment includes front shock absorbers, windshield wiper, rear vision mirror, electric gasoline gage and stop light. Headlights, radiator, cowl lights and surcingle are chromium finished.

Paul Armstrong

CHICAGO, Sept. 22—Paul Armstrong, head of Armstrong Bros. Tool Co. and the Armstrong-Blum Mfg. Co., died this week at his home in River Forest.

Million Output Seen in Closing Quarter

Output of Approximately
2,370,000 in Last Half Will
Establish Record

DETROIT, Sept. 25—Estimates have been made that car output for the last quarter will be somewhere around 1,000,000 units. It is also believed that production for the third quarter may total approximately 1,370,000 units, dependent of course on the figures for September, which gives every indication of being a banner month. The building of 2,370,000 vehicles in the last half will give a year's total of about 4,700,000.

While reports from Florida indicate severe damage from the recent hurricane, the effect generally will be localized and will have little bearing on the general business situation, say factory executives. They point out that Florida has been hard-hit in a business way for the past three years. Business is reported generally good throughout the rest of the country.

Stocks of new cars in dealers' hands or in transit still remain at a minimum with a majority of companies and a number of makers find themselves with more orders than they can fill immediately. Reports from the field indicate that new car sales are maintaining at a level well in excess of a year ago.

With the unprecedented sale of new cars, dealers have taken in many more used cars than in previous years, but reports also indicate that there has been a good market. There are probably two outstanding factors which have aided used car sales, the fact that Ford has been delayed in production has turned many prospective customers to used vehicles; again the high employment rate has created a good demand for the cheap class of used cars by factory workers.

Perry Named President of Battery Association

NEW YORK, Sept. 26—Ward S. Perry of Vesta Battery Corp. was elected president of the National Battery Manufacturers Association at their annual meeting at Atlantic City last week. Mr. Perry succeeds D. H. Kelley, USL Battery Corp. Other officers are J. B. Perlman of Hartford Battery Mfg. Co., first vice-president; A. A. MacLean of USL Battery Corp., second vice-president; Paul M. Marko, Sr., of Marko Battery Co., treasurer; E. C. Handler of Lyons Storage Battery Co., secretary, and L. A. Doughty of Carlile & Doughty, and A. J. Baracree of the Am-Plus Storage Battery Co., as directors.

The next meeting of the association will be held during the first week of April, 1929, in Cincinnati.

G.M. 9 Months Net Exceeds All of 1927

Sloan Sees Possibility of November Stock Dividend—Dealer Stocks Small

NEW YORK, Sept. 24—Sailing Friday night on the S.S. Olympic, Alfred P. Sloan, Jr., president of General Motors Corp., intimated the possibility of a stock dividend to be declared at a directors' meeting in November. He pointed out that nothing had been determined or seriously discussed but that it would be reasonable to suppose that directors would follow the precedent of arranging the corporation's capital so that stock can be as widely held as possible.

Overseas shipments this year, Mr. Sloan expects, will be 290,000 cars and trucks. He looks for a rapid expansion of the foreign market. His statement in part the date of sailing follows:

"Conditions in general with General Motors at this time are satisfactory. At no time have I felt more confidence in the future security of the corporation's position from every standpoint. Earnings are proceeding at an excellent rate. For the first nine months of this year they will exceed those of the entire year 1927, therefore, it appears reasonable to suppose that we should report this year the largest earnings in our history.

"Stocks of General Motors cars in the field are relatively the smallest that they have been at this season for many years past. As a matter of fact, in some lines there is a shortage which is handicapping us. Our new series of cars recently announced—Cadillac, LaSalle and Buick—are taxing the capacities of their respective plants. The favorable reception that Buick has received has forced up production to over 1300 cars a day—a new record.

Cadillac Setting New Records

"Cadillac and LaSalle have been especially well received, particularly the new transmission and braking system. New records for production are being established by the Cadillac plant yet demand is in excess of supply. A new Oakland model will be announced in about three weeks, which I feel sure will be well received. The trend may be judged by the fact that retail sales of General Motors cars for the first eight months are 26 per cent ahead of the corresponding period last year.

"As a matter of fact, retail sales of all important manufacturers in the automotive industry have continued through the summer at an exceptionally good rate. In view of the above it is very evident that there is reflected a general state of prosperity for industry in general, especially in view of the fact that practically all sections of the country are contributing to the general result."

8 Months' Output Climbs to 3,232,302

1928			
	Cars	Trucks	Total
Jan. ...	212,281	27,875	240,156
Feb. ...	301,466	34,847	336,313
Mar. ...	387,053	43,804	430,857
Apr. ...	385,394	49,006	434,400
May ...	405,627	54,411	460,038
June ...	381,780	43,333	425,113
July ...	358,055	57,612	415,667
Aug. ...	422,963	66,795	489,758

Total 2,854,619 377,683 3,232,302

1927			
	Cars	Trucks	Total
Jan. ...	211,395	42,907	254,302
Feb. ...	278,997	44,421	323,418
Mar. ...	365,634	52,033	417,667
Apr. ...	377,899	51,449	429,348
May ...	379,139	50,666	429,805
June ...	295,198	45,956	341,154
July ...	245,585	33,871	279,456
Aug. ...	284,489	36,819	321,308

Total 2,438,336 358,122 2,796,458

	Cars	Trucks	Total
Sept. ...	235,121	36,519	271,640
Oct. ...	189,177	38,224	227,401
Nov. ...	114,076	25,743	139,819
Dec. ...	108,356	28,626	136,982

Total 3,085,086 487,234 3,572,300

U. S. Car and Truck Totals in August Are Revised

WASHINGTON, Sept. 27—Corrected reports from manufacturers of motor vehicles in the United States and a resultant revision of the August production figures already made public by the Department of Commerce make August, 1928, a record-breaking month in automobile production in more angles than at first believed, the high production mark for trucks, as well as for passenger cars and total production being passed.

The department announces that the revised figure covering production of passenger cars is 398,689 instead of 400,689 as originally given, being the largest month on record for such class production. The revised figure covering trucks is 59,824 instead of 57,740 as originally given, surpassing the previous high mark of 59,651 established in September, 1925, and making the total production figure for trucks and passenger cars 458,513 instead of 458,429 as originally given, the largest production ever recorded for a single month.

Canada August Totals 31,245

WASHINGTON, Sept. 27—August production of automobiles in Canada, as reported to the Department of Commerce by the Dominion Bureau of Statistics, totaled 24,274 passenger cars and 6971 trucks. This compares with a July production of 20,122 passenger cars and 5104 trucks, and with a production in August, 1927, of 10,139 passenger cars and 2387 trucks. Production by Ford Motor Co. of Canada, Ltd., in August increased to 13,045.

Rail Lines Operate 3878 Buses in 1927

Large Increase of Equipment and Usage Shown by Department of Commerce

WASHINGTON, Sept. 27—Results of the 1928 five-year census of electric industries just made public by the Department of Commerce reveal the strides taken by motor bus transportation, as operated by electric railway companies and the losses sustained in popularity by the street and electric railway cars during the last five years.

The statistics show that 655 companies were engaged in the operation of electric railways during the year 1927, a decrease of 21 per cent from the 826 recorded in 1922. In 1927, 27,866 miles of line were in operation by those companies, a decrease of 7 per cent from the 30,070 miles in operation in 1922. The number of cars operated in 1927 were 89,642, a decrease of 7 per cent from 95,931 in 1922. The number of car passengers carried in 1927 amounted to 14,521,977,983, a decrease of 2 per cent from the figure of 14,881,857,530 in 1922. The only increase noted between the two years is for the number of car-miles operated, which was 2,120,774,257 in 1927 as compared with 2,081,085,455 in 1922.

Motor buses operated by electric railways show 3878 in operation in 1927, as against 368 in 1922. These operated over 130,015,315 bus-miles in 1927, an increase of 1731 per cent over the mileage of 7,100,624 in 1922.

Buses carried 398,323,932 passengers in 1927, an increase of 2373 per cent over the figure of 16,109,838 for 1922.

The foregoing figures are exclusive of data for 32 electric railway companies believed to have been in operation in 1927 but which had failed to make report prior to Sept. 14, 1928.

Hupp Adds Town Sedan

DETROIT, Sept. 25—A five-passenger town sedan has been added to its eight-cylinder line by the Hupp Motor Car Corp. Listing at \$1,985, this model carries the same standard equipment as other body types. The body is custom-built by Raulang, and in comparison with the standard eight-cylinder sedan provides more room in the rear compartment. This effect is obtained by "bulging" out the body both at the rear and at the sides.

Eaton Plant Ready Jan. 1

CLEVELAND, Sept. 24—The new plant of the Eaton Axle & Spring Co. which is to be erected here at a cost of \$1,000,000 will be ready for occupancy Jan. 1. C. I. Ochs, president, said the company is working at full capacity with the largest amount of business ahead that it has ever experienced. The expansion has been made necessary by increased business in all divisions.

New Hampshire Law Accident Preventive

Withholding of Applicability of Law Until After Mis- hap Insures Caution

BOSTON, Sept. 22—Now that the uproar over the Compulsory Insurance Law proposed new rates has subsided many motorists here are inquiring about the New Hampshire statute under which owners there are operating, and that has come in for praise in a comparative sense.

Edward C. Stone, who drafted the New Hampshire law, points out that it is merely additional remedy for, or extension of, rights already held by the injured person. Under it a preliminary hearing is given in which, if the court rules against the defendant and he cannot show evidence of his financial responsibility to satisfy judgment, both owner and operator are penalized by the suspension of licenses and registration of all motor vehicles of owner and of operator until such security is furnished. Inasmuch as the law is not made applicable until the first accident occurs, an owner may take the chance of operating his car without liability insurance, or he will use greater caution to avoid any accident for which he might be held responsible for more than a small amount of security which he could easily put up.

In this the voluntary method becomes not merely a measure for making owners financially responsible, but also strikes at the root of the evil—by operating as an accident preventive measure. In a booklet compiled by insurance companies of which Mr. Stone is the head it says: "As we may prevent accidents we do not have to provide for financial responsibility."

One fundamental difference between the Massachusetts and New Hampshire plans is the effect on losses and rates. The question is raised as to whether the experience, with everyone compelled to insure, can be better than the experience of those who have voluntarily insured for their own protection. "Must not the tendency of any legally compulsory law be to make the losses mount up, and thus cause increase of rates?" the Stone booklet asks.

Rates Not Made by State

In regard to rate making another fundamental difference in the two state plans is pointed out. There is no making of rates by the insurance commissioner or other public official under the New Hampshire method as in Massachusetts.

Connecticut has a law that goes one step further than New Hampshire, and has been in effect six months longer. It applies only to those owners and drivers who (1) shall have been convicted of (a) driving while intoxicated, (b) reckless driving, or (c) running

Argentine Shipping Taxes Ship Lines

MILWAUKEE, Sept. 22—The third large shipment of tractors to the Argentine this year by the Allis-Chalmers Mfg. Co., has just left the main works in West Allis for Buenos Aires. It consists of 225 units, valued at upwards of \$300,000, and because of the heavy steamship traffic to South America, it was found necessary to route the cargo from three ports. With freight lines crowded, it was found necessary to ship the New York consignment by passenger boat to Buenos Aires. J. R. Sullivan, of the tractor department, is now leaving for Australia to encourage exports of Allis-Chalmers tractors to that country.

away after an accident; or (2) shall have caused either (a) personal injury, or (b) property damage to the amount of \$100. No means of securing himself financially against a judgment is, therefore, required before the owner or operator has his first accident unless he has come within the clutches of the criminal law. Herein also is an inducement to safety as in the New Hampshire law. As under the New Hampshire law the owner or driver who has already insured himself before any accident or conviction need pay no attention to the law until he has had his insurance bond or policy canceled and is unable thereafter to secure either.

Hayes Body Corp. Reports Largest Plant Activity

GRAND RAPIDS, Sept. 22—With 2000 men working full time in its Grand Rapids plant and 500 men working overtime in the Ionia plant, Hayes Body Corp. is enjoying the greatest prosperity in its history, Hal H. Smith, vice-president, reported to directors at the September meeting.

Delivery of Plymouth bodies to Chrysler began on Sept. 18, five days ahead of schedule, and delivery of De Soto bodies to Chrysler will begin Sept. 24. Willys-Overland has increased its September schedule 100 bodies per day; Reo deliveries continue as per schedule and Marmon deliveries will begin in quantity Oct. 1, reported Mr. Smith.

Budd Host at Meeting

DETROIT, Sept. 22—The Budd Wheel Co. was host recently of the semi-annual credit meeting of the Wheel & Rim Manufacturers. The meeting was held at the Detroit Yacht Club, followed by a luncheon, after which the entire group was taken for a sail down the Detroit River.

Cincinnati Business Holds August Pace

Registrations for Month Ex- pected to Approximate High August Total

CINCINNATI, Sept. 22—With the daily average of new car sales in September showing an increase of five over August, there is every indication that total registrations for this month will be very close to the spurt in August when 2005 new cars were sold in Hamilton County. This was a gain of 525 over August, 1927. Used car registrations for the month were 5852 compared with 4255 in August last year, a gain of 1597.

The continued upward trend, as revealed in registrations up to the close of business Sept. 15, in the opinion of Frank J. Santry, vice-president of the Cincinnati Auto Dealers Association, forecasts one of the best fall periods in local history, with every indication that good demand will continue well up to Christmas. August, usually a bad month, surprised every one and the continued daily increase this month is even more gratifying.

The used car situation is characterized as splendid, in spite of the fact that used car sales in the last 60 days have slowed in comparison with the activity in the new car end.

Ford has been going big for the last 60 days, August registrations revealing sales of 341. Chevrolet sales totaled 344.

St. Louis Junks 224 in 15 Days

ST. LOUIS, Sept. 24—The "sideline" activities of the St. Louis Automobile Dealers Association are prospering. In the month since it was inaugurated 2400 members have been obtained for the Emergency Road Service Bureau operated by the dealers. The salvage yard, opened by the dealers Sept. 1, has received 224 "junkers" to date and sold \$1,100 worth of used parts in the first 15 days of operation.

New Jersey Sales 10,455

NEW YORK, Sept. 24—Sales of automobiles in New Jersey during August of this year totaled 10,455 as opposed to 9721, according to Sherlock & Arnold. Sales for the whole year up to Aug. 31 amounted to 80,037, as compared with 75,571 for the first eight months of 1927.

Chandler Sales Gain 128%

CLEVELAND, Sept. 24—Sales of Chandler-Cleveland Motors Corp. will show a 128 per cent increase in September over the same month last year. Third-quarter business will exceed the total for the first half. Unfilled orders indicate a continuance of heavy manufacturing through the closing months of the year, Sid Black, vice-president, said.

Men of the Industry and What They Are Doing

Blanchard and Comings Take New Editor Posts

Don Blanchard has been made editor of the combined "AUTOMOBILE TRADE JOURNAL AND MOTOR AGE," the first issue of which will appear on Dec. 1, 1928.

Mr. Blanchard has been editor of COMMERCIAL CAR JOURNAL, a publication devoted to the interests of truck dealers, for the last year and one-half and prior to that time was associated with the sales promotion department of AC Spark Plug Co. and with the Chilton Class Journal Co. as field editor, contacting both the industry and the trade.

A. V. Comings, for many years editor of AUTOMOBILE TRADE JOURNAL, will be associated with the new publication as manager, trade relations division.

Sherman Swift will be managing editor of the new publication. Technical editors will be Paul Dumas, W. K. Tolboldt and C. E. Packer.

McCorkle Heads Miller Unit

R. A. McCorkle, who has been connected with the tire business for the past 15 years in several important capacities, has been appointed manager of the manufacturers' sales department of Miller Rubber Co. C. H. Russell, formerly in charge of truck and bus tire sales at Akron, becomes assistant to Mr. McCorkle, with headquarters in Detroit; A. L. Bowman, who recently joined the truck and bus tire sales department, becomes manager.

Bitting Leaves Bunting

George L. Bitting, director of sales of the Bunting Brass & Bronze Co., has resigned, effective immediately. Mr. Bitting has made no specific plans for his future activities and plans a brief vacation before resuming activities in the industrial and mechanical fields.

R. C. Graham Goes Abroad

Robert C. Graham, vice-president in charge of sales of the Graham-Paige Motors Corp., accompanied by Mrs. Graham, sailed Sept. 28 to attend the automobile shows in Paris and London, and to make a study of conditions and potential sales possibilities.

Cole to Visit European Shows

R. S. Cole, vice-president in charge of sales, Hupp Motor Car Corp., is among the representatives of America's automobile industry who will visit Europe's 1928 automobile shows. He sailed on the Ile de France, Sept. 29.

Wright Aide to Sales Head

Hal F. Wright has been appointed assistant to the general manager of sales of American Chain Co., Ind., and associate companies, in addition to his other duties.

Columbia to Dine Industry Leaders

Henry Ford, Orville Wright, Glen Curtiss and Harvey S. Firestone are among the guests of honor who have accepted invitations to the concluding dinner of the Conference of Major Industries, to be held at Columbia University, Oct. 24. Other guests include Thomas Edison, Charles M. Schwab and George Eastman.

Durant Executives Go Abroad

John S. Hunt, general manager of the Durant Motor Co. of New Jersey, H. P. Gilpin, export manager, and Carl M. Phillips, chief body engineer, have sailed for Europe, where they will meet W. C. Durant, president. The trip is in connection with the building of the new Durant plant in Berlin.

Wilber Joins Robert Bosch

D. J. Wilber has resigned as sales engineer with the American Bosch Magneto Corp. to join the trade sales division of the Robert Bosch Magneto Co., Inc., as district representative for Michigan and Ontario. His headquarters will be at Detroit.

Warner and McCord Speakers

E. P. Warner, assistant secretary of the navy for aeronautics, and Comdr. C. G. McCord, superintendent of tests of the naval aircraft factory, will discuss airplane powerplants at the meeting of the Pennsylvania Section of Society of Automotive Engineers, Oct. 9.

Wyman Service Manager

H. B. Wyman has been transferred to the main office of the Russell Mfg. Co., Middletown, Conn., where he will become general service manager. He has been service manager at the Chicago branch.

Colling Eastern Manager

C. J. Colling, formerly district manager throughout the East for the Biflex Bumper Co., has been appointed Eastern district manager for the Lubricating Equipment Co., Chicago.

Wegener Named President

Edwin R. Wegener has been elected president of the Detroit Forging Co. and has been named a member of the board of directors.

Rogers Conference Officer

Leighton W. Rogers has been appointed executive officer of the International Civil Aeronautics Conference to be held in Washington, Dec. 12 to 14.

Aviation Leaders to Meet at Guggenheim Conference

The first national aeronautical safety conference, held under the auspices of the Daniel Guggenheim Fund for the Promotion of Aeronautics, will convene in Hotel Pennsylvania Oct. 4 and 5. Among the speakers at this meeting, which will deal with experiments and developments for the elimination of dangers attending flying, will be Charles A. Lindbergh, Paul Henderson, vice-president of National Air Transport; C. L. Lawrance, president, Wright Aeronautical Corp.; Sherman M. Fairchild, president, Fairchild Mfg. Corp., and Ted Wright, chief engineer, Curtiss Aeroplane & Motor Co., Inc.

At this conference, including the well-known flyers and operators of airports as well as manufacturing and commercial flying operators, topics for discussion will include:

Structures and Materials, chairman, Prof. Alexander Klemm, Daniel Guggenheim School of Aeronautics; Airports and Airways, chairman, C. M. Young, director of aeronautics, Department of Commerce, and Dr. W. F. Durand, professor emeritus of Leland Stanford University; Aids to Navigation, chairman, Dr. J. C. Hunsaker, Bell Telephone Laboratory, and Rear Admiral W. A. Moffett, U. S. N., Chief of Bureau of Aeronautics, Navy Department; Medical Aspects, chairman, E. P. Warner, assistant secretary of the Navy for Aeronautics; Safety of Airship Operation, chairman, Commander Garland Fulton, U. S. N.; Power Plant, chairman, Dr. S. W. Stratton, president, Massachusetts Institute of Technology, and General J. E. Fechet, U. S. A., chief of the Army Air Corps; Operation of Aircraft in Air Transport, chairman, W. P. MacCracken, assistant secretary of Commerce for Aeronautics; Weather Service, chairman, Prof. C. F. Marvin, chief of Weather Bureau; The Public and Flying, chairman, William Mayo, chief engineer, Ford Motor Co.; Flying and Ground Personnel, Harry F. Guggenheim, president, the Daniel Guggenheim Fund for the Promotion of Aeronautics; Passenger Safety, Emery S. Land, vice-president, Daniel Guggenheim Fund for the Promotion of Aeronautics; Legislation, F. Trubee Davison, Assistant Secretary of War for Aeronautics.

Murray Executives to Sail

Charles Widman, sales manager of the Murray Corp. of America, accompanied by L. Clayton Hill, assistant sales manager, and Harry Shaw, chief designer, will sail Oct. 3 to visit the European automobile shows. They will study the latest designs of foreign body builders in Paris, London, Brussels, Berlin and other European cities.

A.E.R.A. Attitude Favors Bus Growth

Continued Large Sale to Railways Seen—N.A.C.C. and A.A.A. to Meet

CLEVELAND, Sept. 26—Interest in buses and related exhibits at the American Electric Railway Association show and convention here gives indication that the producer of buses and equipment may look forward to continued large business from railway sources during the coming year. The association is holding its forty-seventh annual meeting this week.

Convention discussions make plain that buses are now recognized as meeting a definite need in modern transportation and possess possibilities for future development that electric railway companies can not ignore.

"Increased experience with the bus," declared R. R. Stevens, president of the association, "has gradually indicated its true economic place." This, he indicated, is not in the replacement of existing railway lines in heavy traffic lanes, but in furnishing service in sections which can not support rail lines; in cross-town and feeder lines, and in distinctive classes of service at rates differing from those charged for mass transportation.

The official publication of the convention said editorially: "We must recognize the fact that we are no longer street car men or interurban men but transportation men prepared to give the public anything in the way of transportation that it wants and will pay for."

Reconciliation of the views of the bus division of the American Automobile Association and the National Automobile Chamber of Commerce on the question of interstate bus regulation is expected to result from a meeting of the legislative committee of the division and the interstate commerce committee of the N.A.C.C. which is to be called in the near future. The meeting was arranged at an assembly of parties interested in bus regulation here yesterday and is designed to bring about agreement upon the action to be taken on the presentation of the Parker bill at the next session of Congress.

To Make British Tractor

WASHINGTON, Sept. 22—A light tractor in both industrial and agricultural types is to be manufactured and marketed by a British company, the Department of Commerce is advised from London. Efforts will be made to market the tractors in the domestic and foreign markets and a former official of a well-known American firm located in England has been employed to direct sales in the home market. Experimental stages in manufacture of the tractors are almost completed and actual production is expected soon.



Harry A. Kaufmann

Named sales manager of the Fargo Motor Corp. of the Chrysler Corp.

Oakland Makes Changes in Fleet Representatives

DETROIT, Sept. 22—Oakland Motor Car Co. is expanding its fleet department according to W. L. Schaffner, manager of the department. Two new fleet representatives have been appointed to operate out of the Cleveland and San Francisco regional offices and a change in personnel is being made in Chicago. With these additions the company will have national fleet representatives working out of four of the six regional headquarter points of the United States.

The new post at Cleveland will be filled by D. B. Ferguson, formerly field representative in the Boston district. R. W. Bush will take up the work for the entire Pacific Coast.

George F. Kleeberg, formerly representative in Chicago, has been transferred to the sales section of the General Motors Corp., with headquarters in Chicago. He is being succeeded by Harry Lehr, formerly supervisor of distribution for the Minneapolis district.

Hall Gets New Contracts

DETROIT, Sept. 25—Hall Lamp Co. has been awarded contracts covering lamp requirements on the De Soto line and the Victory Six line from the Chrysler Corp. This will make an addition of \$2,500,000 to sales volume in the coming year and is equivalent to the entire sales volume in the first half of the year. The company also will furnish lamps for the Wolverine line of Reo Motor Car Co.

Grant to Address S.A.E.

DETROIT, Sept. 24—R. H. Grant, vice-president in charge of sales, Chevrolet Motor Co., will be the speaker at the first fall meeting of the Detroit Section, Society of Automotive Engineers.

Financial Notes

Packard Electric Co. has declared regular quarterly dividend of \$1 and an extra dividend of 50 cents, both payable Oct. 15 to holders of record Sept. 29.

Baldwin Rubber Co.—Application for the listing of 50,000 shares of class "A" stock has been approved by the listing committee of the Chicago Stock Exchange.

Goodyear Tire & Rubber Co. will reopen the rights of stockholders to exchange preferred stock for first preferred on the basis of one share of the former for 1 3/4 shares of the latter. These rights will extend during November and December.

Federal Mogul Corp. is offering 40,000 shares of no par value common stock through Baker, Simonds & Co. of New York and Detroit. The stock is priced at \$20 a share to yield 6 per cent. Dividends will be paid at the rate of \$1.20 annually, the first one on Jan. 1, 1929, to stockholders of record Dec. 15.

Keystone Aircraft Corp. has given its stockholders of record Oct. 1 the right to subscribe to 52,524 shares of authorized but unissued common stock at \$20 a share, in the ratio of one new share for each two shares held. Rights will expire Oct. 10. The purpose of this offering is to provide capital for further expansion, particularly in the commercial air flying field.

Dodge Brothers, Inc., has announced that all but 14,000 shares of its preferred stock formerly outstanding, has now been exchanged for shares of the Chrysler Corp. Arrangements have been completed for calling for redemption at \$105 and accrued dividends, this remainder of undeposited stock, amounting to about 1 1/4 per cent of the total issue. Exchange of the Chrysler stock for Dodge preference stock, therefore, has ceased.

Sterling Motor Truck Co., Milwaukee, has revamped its capital structure coincident with splitting up its common stock on a four-to-one basis and in addition, declaring 50 per cent stock dividend valued in excess of \$500,000. The \$1,000,000 of common now outstanding, consisting of 10,000 shares with a par value of \$100 each, is being changed to 100,000 shares of no par value of which number 60,000 shares will presently be outstanding. The \$750,000 of authorized 8 per cent preferred stock is being increased to \$1,000,000. There is now \$465,000 of the senior stock outstanding.

Caterpillar to Buy Grader

SAN FRANCISCO, Sept. 25—The Caterpillar Tractor Co. which maintains a large plant at San Leandro, Cal., as well as at Peoria, Ill., is negotiating for control of the Russel Grader Mfg. Co. Announcement to this effect is made by Peirce, Fair & Co., bankers for Caterpillar.

Wilkening Buys Plant

PHILADELPHIA, Sept. 22—Wilkening Mfg. Co., manufacturer of the Pedrick piston ring, has bought the McFarland-Meade Co. plant here which it will use to expand its manufacturing facilities.

Packard Radial Air-Cooled Diesel Engine Seen Increasing Plane Cruising Radius 25%

DETROIT, Sept. 24—The new nine-cylinder radial air-cooled 200 hp. Diesel aircraft engine developed by the Packard Motor Car Co. in preliminary test flights conducted by Walter Lees, pilot, and Capt. L. M. Woolson, aeronautical engineer for Packard, has proved highly satisfactory. At the invitation of Captain Woolson, an *Automotive Industries* representative was one of the first three passengers to fly behind the new engine.

While declared by Packard to be still in the experimental stage, the new engine shows remarkable capabilities. With the engine mounted in a standard Stinson-Detroit monoplaner, the take-off was unusually rapid and initial climb equal to that of this plane equipped with any comparable engine.

No starter had been fitted to the engine, but a few revolutions of the propeller for building up pressure and a single pull after making "contact" started the engine immediately. After warming up the engine was idled down, and at 400 r.p.m. was very smooth, when it is considered that this is an experimental engine. No effort was made to determine maximum speed of the plane with this engine, but its cruising speed at 1650 r.p.m. was roughly in the neighborhood of 90 m.p.h.

In view of the fact that considerable experimental work is to be carried on with the engine before its final introduction to the industry, Packard officials are withholding details. Externally, however, the engine presents no

startling deviation from average radial engine design, its frontal area being about the same as that of comparable engines of this type. The major difference in appearance is the cleaner cylinder head obtained with the elimination of the exhaust valve gear, spark plugs, wires, etc. In its dynamometer tests the engine is said to have developed well over 200 hp. at around 1850 r.p.m., which will probably be close to the rated speed of this powerplant.

Fuel consumption, as in other types of Diesel engine, is markedly lower than that obtainable with gasoline powerplants, being in the neighborhood of 0.4 lb. per hp. per hr., or less. The development of such an engine has long been the ambition of many engineers, if only for the elimination of fire hazard in airplanes. Its final development should be instrumental in enabling a 25 per cent increase in cruising radius or pay load in airplanes due to the lower fuel consumption and lower weight of the tanks.

Although development of this type of powerplant has been in progress by Packard for some time, it is known that actual work on the engine itself was put under way less than a year ago. Associated with Captain Woolson in the design and development were Prof. Hermann Dörner, one of the foremost Diesel engine authorities of Germany, and Adolph Widmann. The work was under the direction of Col. J. G. Vincent, vice-president in charge of engineering of the Packard company.

Canadian July Exports Increase 2442 Over June

WASHINGTON, Sept. 22—Canadian exports of passenger cars and trucks showed a marked increase during July when 6545 passenger cars and 1476 trucks valued at \$2,991,649 were shipped from the Dominion to foreign ports, according to the Department of Commerce. The increase amounted to 2442 cars and \$114,359 in value, over June. The increase was due to a large number of passenger cars valued to \$500. Average price of passenger cars shipped was \$376, the lowest of any month during 1928.

The leading market for the Canadian automobile exports during July was Australia, British India being second. Other countries taking large shipments were New Zealand, United Kingdom and British South Africa in the order of importance. British India retained its place as the best market for Canadian trucks, with Australia second, and British West Africa, third.

Chrysler Adds Phaeton

DETROIT, Sept. 24—Announcement is made by the Chrysler Corp. of the

addition of a five-passenger phaeton listing at \$1,795 to its Series 75 line. It includes such special features as forward folding windshield, side ventilators in the cowl and in the doors for the rear compartments, non-shatterable glass for the windshield as well as for the special equipment tonneau windshield.

Lahey Increases Dividend, Natural Gas Cuts Costs

DETROIT, Sept. 24—Directors of the Lahey Foundry & Machine Co. have increased the dividend rate from \$1.20 a share per year to \$2 and an extra 10 cents per share for the quarter. The increased regular quarterly dividend of 50 cents and the extra dividend of 10 cents is made payable Oct. 31 to stock of record Oct. 20.

The action was made possible, said H. A. Becker, president, due to the increased earnings of the company during the year and the unusual volume of new business which has recently been closed. Some of the company's large customers have materially increased their schedules and one has practically doubled its requirements for the bal-

ance of the year. The productive capacity of the foundry is being taxed to the limit, making rearrangements of production lines necessary in order to take care of the increased business.

The natural gas supply from the newly developed gas fields in Muskegon is now being used in the foundry at an estimated annual saving of from \$100,000 to \$150,000 a year.

Seaman Body to Increase Punch and Press Units

MILWAUKEE, Sept. 22—As part of a \$2,000,000 plant enlargement program decided upon by Charles W. Nash, president of Nash Motors Co., the Seaman Body Corp. has placed contracts for the construction of another wing addition to its plant. It will be five stories, 100 x 385 ft.

The first story will actually be of two-story height and will be equipped as a metal and press room, for concentration of production not only of steel body panels, but the stamped parts. A battery of new punch and drawing presses has been ordered. The unit is to be ready early in January, when work will be started on another wing of similar dimensions and height. The powerplant is also being enlarged to meet the increased demand for current.

The Seaman payroll at present numbers upwards of 6500 and the daily output averages 1000 enclosed bodies, all absorbed by the Nash factories. The Seaman-Dunning Co., Pine Bluff, Ark., another Nash-Seaman subsidiary, is also enlarging its plant to enable it to meet the enlarged requirements of the Milwaukee body factory for hardwood body stock.

Graham-Paige Wins Award

DETROIT, Sept. 22—Graham-Paige was the only American car to win a prize at Switzerland's first international elegance competition, held recently at Lucerne. Thirty leading makes of European and American automobiles contested. First and second prizes went to custom-built European cars, an Isotta-Fraschini and a Martigny. An eight-cylinder Graham-Paige five-passenger sedan was third, winning the highest award for cars carrying standard production bodies.

In a similar contest at Karlsbad, Czecho-Slovakia, a Graham-Paige took the prize in its class.

Pines Gets Orders Early

DETROIT, Sept. 22—James F. Raleigh, president of the Pines Winterfront Co., announces that orders for attachable winterfronts are being booked from all over the United States more than a month ahead of orders in previous years. The plant has started a production schedule of 50,000 a month, in addition to the production schedule for built-in automatic shutters. Sales of attachable winterfronts are expected to be 50 per cent larger than last year, which was the best in the history of the company.

Industry Continues Pressure for Steel

Sheet Mill Orders Insure Fair Operations Well Into Final Quarter

NEW YORK Sept. 27—With sheet mills having sufficient business on their books to provide a fair rate of operations during October and the better part of November, it is only natural that from now on a slower pace in the placing of new business must be looked for. Pressure on the production facilities of leading finishers of automobile stock continues heavy. A good deal of cold-rolled strip steel has been bought for fourth-quarter shipment at 2.75 cents base, which figure now applies to large lot business only.

Shipments of automotive alloy steels into consumption continue at a satisfactory rate. While the nominal fourth-quarter price for hot-rolled steel bars is 2.00 cents, Pittsburgh, large consumers have protected themselves at 1.90 cents. In some instances, tonnages have been contracted for at 1.95 cents. The price of cold-finished bars has undergone no upward revision so far, but the undertone of the market is stronger.

Market talk centers around just how much of the price advances which mills have announced for fourth-quarter will show up in fourth-quarter billings. Obviously producers are satisfied that the strategy of announcing higher prices has more than justified itself. In most instances it has served to bring out volume business at old prices that otherwise could not have been obtained, save by offering concessions. The run of small lot business over the fourth quarter will yield actually higher prices.

On the other hand, consumers have no cause to complain, there having been no sign of an arbitrary attitude on the part of producers who frankly stated that they would have to get slightly better prices, but who did this in a "meet you half-way, give and take" frame of mind. It is to this brand of tactful salesmanship that the steel industry owes acceptance of the lower cash discount rate which goes into effect next Monday, and which, because unlike price changes it has come to stay for good, means far more to the producers than would a \$1 or \$2 per ton advance in quotations that might not live for more than a few weeks.

Pig Iron—While some of the Middle West markets continue quite active and in a few instances higher, the Valley foundry market seems to be marking time. On the whole, the situation is firm, with shipments to automotive foundries heavy.

Aluminum—The market is devoid of new developments.

Copper—Leading producers ascribe the advance in the copper market solely to the rush of fabricators to buy at a time when metal reserves were "dangerously low."

Tin—American deliveries for September exceed 7500 tons, approximately 25 per cent more than in September, 1927.

N.A.C.C. to Give Taxi in Old Cab Search

NEW YORK, Sept. 24—Pursuing its policy of offering prizes for oldest vehicles to be used in connection with the national automobile show, the National Automobile Chamber of Commerce is offering a prize for the discovery of an electric cab made by the Electric Vehicle Co. of Hartford prior to 1900. This prize is being offered to the taxi drivers and consists of a free Yellow Cab. The cab will be awarded to the first driver to furnish information which will lead to the discovery of the whereabouts of one of these electric cabs made by the Electric Vehicle Co. sometime between 1898 and 1900.

Light Aircraft Demand Shows Gain in Canada

WASHINGTON, Sept. 27—Canadian demand for light aircraft is steadily growing according to advices to the Department of Commerce from its representatives at Ottawa. Flying in Canada has been used primarily as an improved method of observation although more and more attention is being accorded air mail and passenger services. During 1927 commercial companies more than doubled their flying time and civil operations for the government increased proportionately.

The present increasing demand for light aircraft is a result of the extension of the varied purposes such as observing for the sealing fleets off the Newfoundland coast, forest fire prevention patrols, and fishery patrols in the Far West, observation of ice conditions in the winter in Hudson Straits and air transport in the Yukon as well as air mail and passenger services.

Columbus Aircraft Formed

COLUMBUS, Sept. 24—The Columbus Aircraft Co., capitalized at 1000 shares of no par stock, has been organized in Columbus to manufacture a new type of monoplane which has been perfected by J. F. Frame, treasurer of the Columbus Auto Brass Co., in collaboration with army engineers at Wright Field, Dayton. The plan will be of the four-passenger enclosed type and the first machinery has been finished and thoroughly tested. Production will start soon, according to the officers of the company. The plane will have a 12 hp. Ryan-Siemer engine.

Mather Leaves Graham-Paige

DETROIT, Sept. 22—G. Clark Mather has resigned as consulting engineer with Graham-Paige Motors Corp. He was formerly chief engineer of the Paige-Detroit Motor Car Co.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, Sept. 27—The recent storms in Georgia, Florida, and the Carolinas have caused considerable damage to the crops; and to some extent these will affect general business, temporarily, at least, in these sections. Nevertheless, weather conditions throughout the country have been favorable during the past week, and the cool temperatures have facilitated harvesting and marketing of crops. Trade in the North, West, and some parts of the South has likewise benefited by the seasonable weather.

FREIGHT CAR LOADINGS

Car loadings for the week ended Sept. 8 totaled 991,042 cars, showing a decrease of 125,906 cars below the total for the preceding week. This large decrease is the result of the Labor Day holiday. However, loadings for the week ended Sept. 8 were 1243 cars above the figure for the corresponding week in 1927.

LIFE INSURANCE SALES

Sales of ordinary life insurance during August amounted to \$702,275,000, which is \$21,000,000 above the figure for August last year.

FISHER'S INDEX

Professor Fisher's index of commodity prices was 99.8 for the week ended Sept. 22, which compares with 100.3 the week before and 99.7 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Sept. 19 were 10 per cent above those in the corresponding week last year.

STOCK EXCHANGE

The volume of dealings on the stock market last week continued large; and, although the fluctuations in the call money rate caused some irregularity in prices, the general trend continued upward. Brokers' loans in the week ended Sept. 19 increased \$85,285,000, despite the fact that loans for the account of non-banking institutions and individuals decreased approximately \$10,000,000.

FEDERAL RESERVE REPORT

The total loans of Federal Reserve member banks secured by stocks and bonds, including United States Government obligations, increased \$65,000,000 during the week ended Sept. 19, while all other loans and discounts declined \$11,000,000 in this period. The combined statement of the Federal Reserve banks for the week ended Sept. 19, showed an increase in holdings of government securities of \$3,400,000 and an increase of \$26,000,000 in bills bought in the open market. An outstanding feature of the report was an increase of \$24,600,000 in holdings of discounted bills.

N.A.C.C. Endorses Uniform Traffic Law

NEW YORK, Sept. 22—The National Automobile Chamber of Commerce has adopted the following resolution endorsing the uniform traffic code recently drafted by the National Conference on Street and Highway Safety:

Believing that the Uniform Municipal Traffic Ordinance drafted by the National Conference on Street and Highway Safety (Hoover Conference) represents a forward step in motor transportation, and

Believing that the ordinance will result in the saving of human life, and

That it is a benefit to the traveling public, and

That it will bring about uniformity and clarity in traffic regulations, and

That it is in accord with sound legal views and principles,

We, therefore, hereby resolve:

That the National Automobile Chamber of Commerce endorse the Uniform Municipal Traffic Ordinance.

That it urge the adoption of this ordinance in all municipalities in order that laws may be uniform so that motor transportation may be operated with greater safety and efficiency.

Celoron Has Record Month

BRIDGEPORT, PA., Sept. 24—The Celoron Co. is now installing press equipment in its new factory here and will be ready for increased operation within a short time. The company reports August business as the largest in the history of the company and looks for further increase during the present month.

Opens New York Office

NEW YORK, Sept. 22—Niagara Machine & Tool Works of Buffalo, N. Y., manufacturer of machines and tools for sheet metal working, have opened an office at 50 Church St. H. D. Rosenkrans is district sales manager.

Coming Feature Issues of Chilton Class Journal Publications

Oct. 10—Marketing Annual for 1929—Motor World Wholesale.

Nov. 17—Production and Factory Equipment Issue—Automotive Industries.

Rubber Stock Figures Make Market Irregular

NEW YORK, Sept. 24—Considerable irregularity featured the crude rubber market last week, due primarily to issuance of stock census figures in Malaya, according to F. R. Henderson Corp. Stock on hand Aug. 31, according to the census, was 65,052 tons as compared with 62,721 at the end of July and 58,327 at the end of June.

Stocks on the estates at the end of August were 52,905 tons as compared with 53,666 at the end of July, which fact is taken by the Henderson company as indicative of a tendency on the part of the estate owners not to accumulate too large stocks for dumping on Nov. 1, when restriction will be removed.

Stocks in London increased during the week to 32,110 tons. Arrivals in New York from Sept. 1 to 21 are estimated at 25,900 tons.

Carver Takes G.M. Post

DETROIT, Sept. 22—Walter L. Carver has joined the staff of the sales section of General Motors Corp. Mr. Carver was technical field editor of the Chilton Class Journal Co. at the Detroit office, resigning that position some months ago to assume an executive position with Kelvinator Corp., which he is now leaving to join General Motors.

July Tire Business Brings Stock Lower

NEW YORK, Sept. 22—Production and shipment of balloon tires during July continued at a pace above July of last year, with production sufficiently far ahead so that inventories at the end of July exceed those of a year ago. Production of high pressure cord tires, on the other hand, both casings and tubes, was much lower in July this year and inventories are lower.

Comparative figures follow:

Balloon Casings			
	Inven- tory	Produc- tion	Ship- ments
July, 1928 ..	5,215,331	3,358,203	3,658,636
June, 1928 ..	5,587,566	3,658,508	3,486,748
July, 1927 ..	4,465,684	2,195,215	2,181,168
Balloon Inner Tubes			
July, 1928 ..	6,794,803	3,240,455	3,576,465
June, 1928 ..	7,311,204	3,553,191	3,184,056
July, 1927 ..	6,139,588	1,931,454	2,161,532
High Pressure Cord Casings			
July, 1928 ..	3,039,349	1,506,228	2,207,086
June, 1928 ..	3,362,861	1,345,857	1,812,907
June, 1927 ..	3,694,710	1,600,389	2,146,846
High Pressure Inner Tubes			
July, 1928 ..	4,435,798	1,764,761	2,970,017
June, 1928 ..	5,558,455	1,661,897	2,168,337
July, 1927 ..	5,864,076	2,032,283	3,141,014

Plating Industry at Peak

MATAWAN, N. J., Sept. 22—The Hanson-Van Winkle-Munning Co. held its annual sales convention at Asbury Park, Sept. 11 to 15, E. N. Boice, secretary and sales manager, presiding. Van Winkle Todd told salesmen that the year past was a banner year for plating industry and predicted a continuance of prosperity.

Lincoln Shows Equipment

CLEVELAND, Sept. 24—Lincoln Electric Co. salesmen viewed important new developments in the design of electric arc welding equipment in the laboratories here Sept. 14 and 15. Announcement of the new developments is soon to be made.

Calendar of Coming Events

SHOWS

Aeronautical Exposition, Coliseum, ChicagoDec. 1-9
American Road Builders Association, Inc., Cleveland Auditorium...Jan. 14-18
American Society for Steel Treating, Commercial Museum, PhiladelphiaOct. 8-12
American Welding Society, Commercial Museum, PhiladelphiaOct. 8-12
Automotive Equipment Association, Coliseum, ChicagoOct. 22-27
BerlinOct. 11-20
Boston, Mass., Mechanics Bldg...March 2-9
BrusselsDec. 8-19
Buenos AiresNov. 29-Dec. 9
*Chicago, National, Coliseum, Jan. 26-Feb. 2
International Aviation Exposition, BerlinOct. 8-28
London, passenger carsOct. 11-20
MontevideoNov. 10-19
National Standard Parts Association, Cleveland Auditorium...Oct. 29-Nov. 3
*New York, National, Grand Central PalaceJan. 5-12
Paris, passenger carsOct. 4-14
Paris, trucksNov. 15-25
Salon, Automobile Salon, Inc., Hotel Drake, ChicagoJan. 26-Feb. 2

* Will have special shop equipment exhibit.

Salon, Automobile Salon, Inc., Hotel Biltmore, Los AngelesFeb. 9-16
Salon, Los Angeles Motor Car Dealers Association, Biltmore Hotel...Oct. 17-20
Salon, Automobile Salon, Inc., Hotel Commodore, New YorkDec. 2-8
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco...Feb. 23-Mar. 2
Western States Metal and Machinery Exposition, Los Angeles.....Jan. 14-18

CONVENTIONS

American Gear Manufacturers Ass'n, Statler Hotel, Buffalo, N. Y...Oct. 11-13
American Institute of Mining and Metallurgical Engineering, Metals Division, Benjamin Franklin, PhiladelphiaOct. 8-12
American Road Builders Ass'n, Inc., Cleveland AuditoriumJan. 14-18
American Society for Steel Treating, Commercial Museum, PhiladelphiaOct. 8-12
American Society for Steel Treating, Semi-Annual Meeting, Los AngelesJan. 14-18
American Welding Society, Commercial Museum, PhiladelphiaOct. 8-12
Automotive Equipment Association, Coliseum, ChicagoOct. 22-27
International Air Conference, WashingtonDec. 12-14

Mid-West Motor Truck Transportation Congress, Indianapolis...Oct. 23-26
National Highway Congress, Mexico CityOct. 3-6
National Metal Congress, Los AngelesJan. 14-18
National Research Council, WashingtonDec. 13-14
National Safety Council, National Congress, New YorkOct. 1-5
National Standard Parts Association, Hollenden Hotel, Cleveland, Oct. 29-Nov. 3
Society of Industrial Engineers, Rochester, N. Y.....Oct. 17-19

A. S. M. E.

Cincinnati, Oct. 22-25—Machine Shop Practice.

S. A. E.

National

Chicago, Dec. 6-7—Aeronautic.
Detroit, Book-Cadillac, Nov. 22-23—Production.
Detroit, Book-Cadillac, Jan. 15-18—Annual.
Newark, Robert Treat Hotel, Oct. 17-19—Transportation.
New York, Hotel Astor, Jan. 10—Annual Dinner.

RACES

SalemOct. 12